

A CHILTON

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the IRON AGE

THE NATIONAL METALWORKING WEEKLY

DETROIT MICHIGAN

October 29, 1953

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MENTS PAGE 2

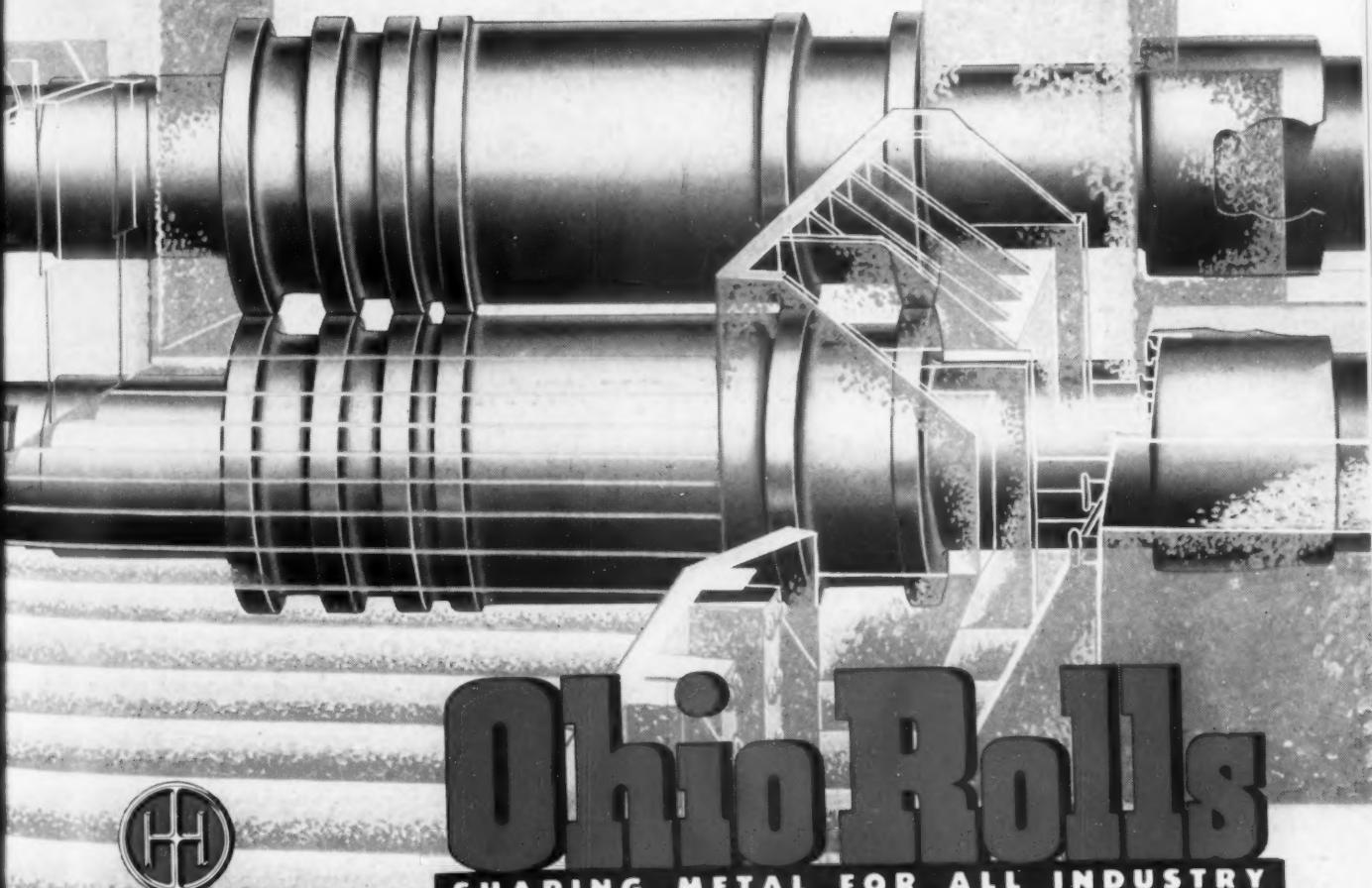
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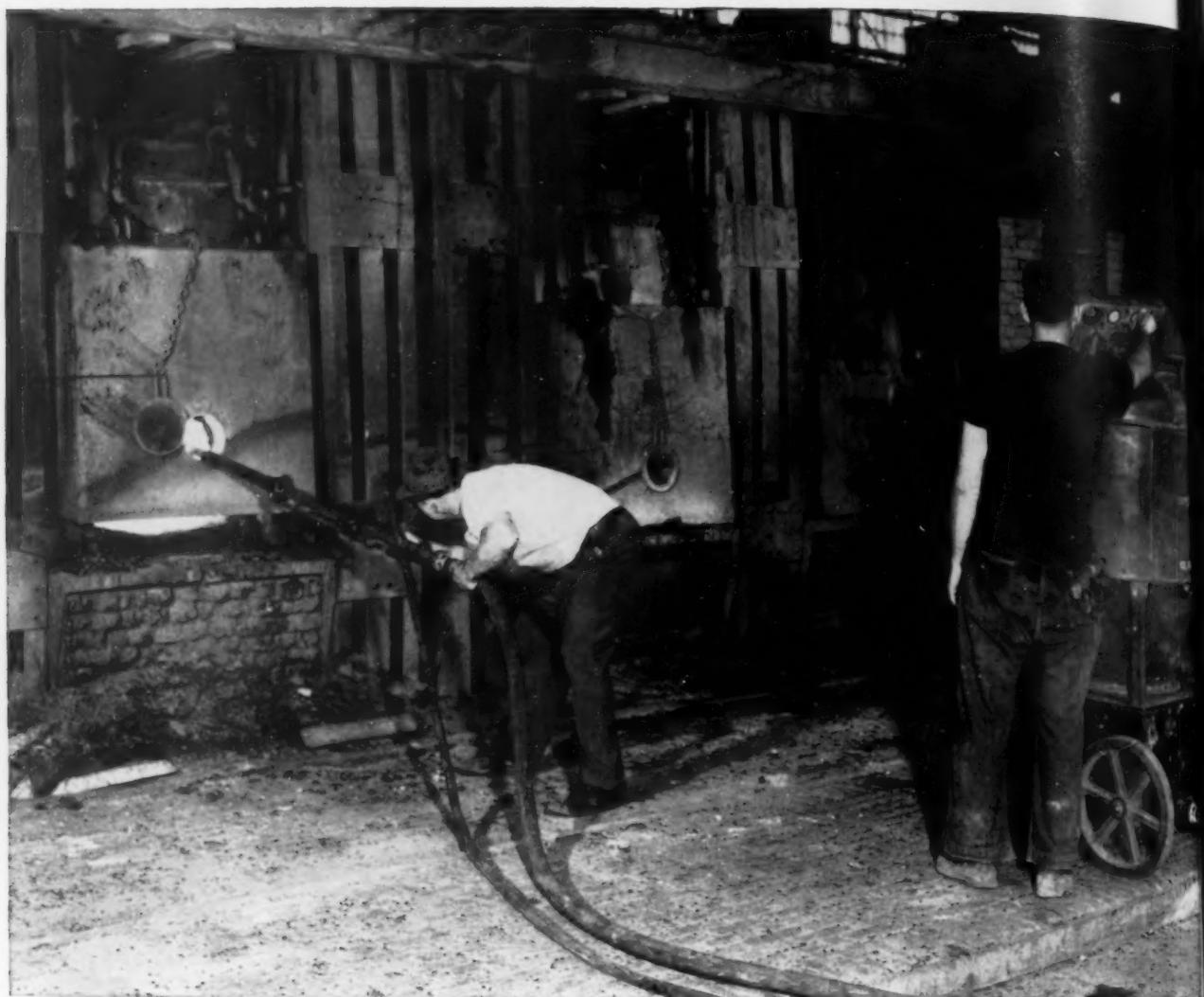


Ohio Rolls
SHAPING METAL FOR ALL INDUSTRY



THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO • Plants at Lima and Springfield, Ohio



Open hearth back wall is repaired with BRI Gun and Roebling furnace stays on line 3 extra weeks

HERE is another instance in which a BRI Gun paid for itself on a single emergency job.

Shortly after John A. Roebling's Sons Corporation placed their BRI Gun in service, a section of the back wall near the skew in one of their open hearth furnaces began to erode. This section was repaired with Gundol and Gunchrome M and the furnace kept on the line for three weeks, until the furnace went down for a scheduled rebuild.

Now, fourteen months later, practically all Roebling furnace personnel are expe-

rienced in the operation of the BRI Gun and use the equipment regularly. Consequently, furnace life has been increased and the problem of skewback maintenance virtually eliminated.



Roebling's experience confirms that of the several hundred BRI Gun owners who have found the equipment easy to operate, cheap to maintain and highly effective for making emergency as well as routine repairs.

If you are not yet sold on the gun and on Gunchrome, Gundol and Gunmix, why not ask your Basic representative for the whole story?

Basic Refractories Incorporated

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Located at Wilshire and Grand, Los Angeles, the Standard Federal Savings and Loan Association building resembles a sheer block of glass. Sealed windows extend in horizontal bands around each floor, separated by continuous spandrels of blue-gray porcelain. Interior columns have been eliminated by means of clear-span steel construction. Deadweight has been reduced with steel floor decking. *Architect: Welton Becket and Associates. General Contractor: C. L. Peck.*

9-STORY STEEL FRAMEWORK ERECTED IN TWENTY-NINE DAYS

Structural steelwork for this 9-story Los Angeles office building was completely erected and riveted by Bethlehem Pacific in just 29 working days. This is not necessarily a new speed record, but it is excellent time for a job of this size. It shows how this company is organized and equipped to handle large-tonnage steel construction efficiently

and without costly delay to the general contractor or owner.

Bethlehem Pacific operates structural-steel rolling mills at Los Angeles, South San Francisco and Seattle; fabricating works at Los Angeles, Alameda, South San Francisco and Seattle; erection equipment depots at strategic localities along the West Coast.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Spokane

BETHLEHEM PACIFIC



The Iron Age

Vol. 172, No. 18, October 29, 1953

★Starred items are digested at the right.

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Address mail to 100 E. 42 St., N. Y. 17, N. Y.

DIGEST of

NEWS DEVELOPMENTS

AUTOMATED FOUNDRY UPS OUTPUT, MORALE — P. 39
Automation and air conditioning are paying dividends in several directions at Ford's Cleveland foundry. Cleaner, less arduous working conditions have boosted output, morale, cut accident rate. Telling the story of modern foundry conditions has brought a definite change in workers, attracting a better type.

LET TIME-LAPSE CAMERA FIND OUTPUT FLAWS — P. 46
One of the more recent angles of using the motion picture camera in industry is time-lapse photography which finds flaws of long-term materials, handling production processes. The camera automatically takes pictures at time intervals of a minute or so. How to put your own sound track into films.

LILLIPUT MODEL ENGINES TEACH PRECISION — P. 43
As a boy you probably built at least one model airplane, powered it with twisted rubber strands. But your son's effort is probably powered by a precision miniature engine. This hobby, blessed by the military, trains boys and young men in the groundwork of aviation, provides a pool of skilled men and machines.

UNION SOUNDS OFF ON FUTURE DEMANDS — P. 51
United Steelworkers of America "Operation Soundoff" was a booming success. Union men left the New York gathering with no doubts about what contract gains the USW will strive for next year. Higher pensions lead the list with management-paid social insurance, high wages, guaranteed annual wage following.

AUTO ADVANCES ATTACKED AS NEW DANGERS — P. 106
Industry critics are criticizing some automotive engineering developments as new safety hazards, even though increased safety is claimed. Under special attack are power brakes, increased horsepower. The industry replies that it always strives for safer auto stresses use, not abuse of new features.

SEE SHIFTS IN U. S. STOCKPILE PROGRAM — P. 110
More juggling and revision of the government stockpiling program may be expected from the latest investigation of charges ranging from unjustified foreign purchases which hurt U. S. industry to allegations of purchase of inferior, unusable materials. Biggest contention is on lead and zinc.

of the Week in Metalworking.

ENGINEERING & PRODUCTION

ABRASIVE SHOT BLASTS HR STEEL CLEAN—P. 91
Blasting of hot-rolled steel strip and sheet with abrasive steel shot has cut cleaning costs sharply in many processing plants. Shot is hurled at high velocity from bladed wheels rotating at 2250 rpm. Directional control is acquired without using compressed air. Units may be used alone or added to pickling lines.

HOW MACHINABLE ARE THE BORON STEELS?—P. 94
Here are results of an extensive study of machinability of six standard alloy steels and seven equivalent boron steels. The study was undertaken by the Watertown Arsenal and work on the project was done by Metcut Research Associates. Tests showed these steels have better machinability than some standard grades.

FLUX SUPPLIES HARDSURFACING ALLOY—P. 98
Alloy content of deposited metal for hardsurfacing operations is supplied by a flux mixture rather than by an electrode wire. One flux in mixture contains carbon and chrome alloys; the other is the standard flux for mild steel. Arc action on flux is like an electric furnace when ferro-alloy is added to low-carbon steel.

METAL-CERAMIC AND THERMOCOUPLE LIFE—P. 100
Thermocouples used to check temperatures of molten brass or checker bricks in openhearts now have a longer life expectancy. It's due to use of a metal-ceramic material for the thermocouple well in place of the all-metal double wall well. The material has a 77 pct Cr, 23 pct aluminum oxide content.

CAMSHAFT HEAT TREATMENT IS IMPROVED—P. 106
Fast, uniform heating in a salt bath substantially aids production hardening of precision-built camshafts for tank engines at Continental Motors. Camshafts up to 50 in. long and weighing 22 lb are heated in neutral salt in 15 minutes. Press quenching is used to prevent distortion during hardening.

NEXT WEEK—FABRICATORS USE EXTRUSION PRESS
Aluminum door and window makers benefit by installing extrusion presses. A variety of shapes can be produced to meet the growing need for quick service, lower material costs, better quality control. One fabricator using a 1250-ton press can make six extrusions at once. Extrusion dies can be switched in 5 min.

MARKETS & PRICES

APPLIANCE SALES FOIL INDUSTRY PESSIMISTS—P. 50
Despite storm warnings earlier this year, appliance makers kept right on producing. Their confidence paid off when increased selling effort moved their inventories. New product lines helped a lot, too. Raw materials are no longer scarce, and inventories are being watched. Washers, driers show good gains.

HOW ONE FIRM KEEPS INVESTORS COMING—P. 51
"Never let them forget you," is the slogan of firms seeking to keep the investment pipelines open. Keep your name, profits and dividends, earning potential, corporate vitality before the investing public. Allegheny Ludlum Steel Corp. does all the usual things—and then some. Analysts get 2-day plant tour.

MACHINE TOOL EXPORTS ARE A TOUGH MUST—P. 69
Sales to foreign markets are a peacetime necessity to most American machine tool builders. European competition has taken advantage of the U. S. domestic boom, is now a real challenge. And some sales techniques have gotten rusty through disuse. Financing overseas sales is a real problem without aid.

ECONOMY READJUSTMENT WON'T AVALANCHE—P. 71
Softening of business will be spotty and sporadic at certain manufacturing levels. With industry now geared to accept easing, recession has lost a major weapon—the surprise that triggers panic. Don't be alarmed by publicity given to recent employee layoffs. They are still negligible, result from backlog dips.

PURCHASING AGENTS PUSHING ADVANTAGE—P. 119
Steel purchasing agents are back in the drivers' seat again. They are frankly shopping for the best price. And price is more important than delivery—or even loyalty to a supplier. Some purchasing agents are taking the initiative in asking steel suppliers what move they will make to counter competition.

WOULD LIMIT "BUY AMERICAN" EXCEPTION—P. 121
Aluminum warehousemen are seeking a revision in the Government's recently announced decision to exempt aluminum from the Buy American Act for armed forces procurement. The aluminum distributors would limit it to pig and ingot only. Meanwhile remelt aluminum and scrap metals are expected to rebound.

JEFFREY VIBRATING FEEDERS

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Acme's Jeffrey-Traylor
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Limestone Rocks

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Units Give Fixed Flow

Jeffrey-Traylor vibrating feeders deliver the load *when* and *where* you want it. Our engineers will gladly show you how.

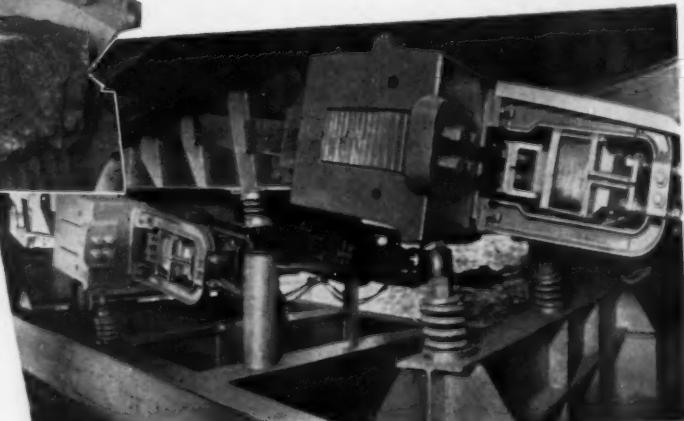
**Acme Installation Handles
Millions of Tons of Rock
With Finger-tip Control**

The Jeffrey-Traylor electric vibrating primary feeder shown here keeps even 7-ton blocks of quarry-run rock moving smoothly into the primary jaw crusher at the Acme Limestone Co. plant, Fort Spring, W. Va.

The feeder is 5' wide by 11', 6", powered by four Jeffrey-Traylor electric vibrators, with the operator maintaining precise load control by simply turning a rheostat knob. Rock comes off a single stone deep.

More than a million tons of crushed stone have been handled on one mild steel feeder deck. Acme reports, "This machine was operated throughout last season without any change or one cent of maintenance. It meets every requirement 100 per cent."

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and the Engineering Index.



Editorial

The Iron Age

FOUNDED 1853

What's Ahead For Industry?

THERE is some concern about 1954 business prospects. This anxiety is usually expressed privately. Public statements that things are rosy fail to reassure many businessmen. Such a frame of mind could cause a synthetic collapse—if carried too far and too long.

We have our own forecasts to add to those already made. Time will tell whether we were closer to the truth than those who are more pessimistic. Here is what we believe:

¶ There will be no depression or deep recession in 1954. Current savings, a rebirth in salesmanship, normal business and a \$40 billion or more defense program put both possibilities out of the question.

¶ Metalworking activity will dip some more in 1954. Our guess is that volume may be off from 10 to 15 pct from 1953 highs during the first 6 months of 1954 but profits won't be off that much. This will be due to less urgency to buy. Inventory "correction" will continue to be a factor in 1954.

¶ Some time in the latter part of 1954 competition and new products will give a boost to the economy. Replacement of machinery to keep costs down and profits high will pick up speed. Some of the promises made years ago about "our great postwar period" will start to come true—color television, air conditioning, super super highways, electronic advances being a few.

¶ Our government will cut personal taxes and eliminate the excess profits tax but it will put through other taxes. Net effect of the tax cuts on the consumer will not be as great as many think.

¶ Steel labor will fight for and may strike to get a \$150 a month minimum pension (federal plus noncontributory).

¶ There will be no wide open break in steel prices in 1954. Cuts so far have involved elimination of premium prices—so called regular prices are unchanged. There is a chance that inflationary tendencies might show up late next year.

The ultimate consumer—about whom very little is known—will determine what 1954 has in store for you. Now that competition is here and "order taking" is out the window you will rely more upon yourself. There is plenty of work to do from here on out.

Tom Campbell

Editor



HIGH SPEED FLAT WIRE MILLS

These high-speed Torrington units are designed to roll flat wire at high production rates. Available in a wide variety of sizes with automatic controls, they provide maximum flexibility. Combinations of two or three flattening stands together with edgers accommodate a great variety of work. Handles 4,000 lbs. weight at entry, up to 1,000 lbs. on winder, with speeds as high as 3500 FPM and more. All operations can be performed by power—pneumatically, hydraulically or by electric motor—under operator's control at a main pulpit or at control stations advantageously located.

THE

TORRINGTON

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TORRINGTON, CONNECTICUT

Dear Editor:

Letters from readers

Part Marking

Sir:

In your Sept. 10 issue under Technical Briefs, you carried an item concerning a marking device for part marking. It is indicated that the product is being made by the New Methods Steel Stamps, Inc., of Detroit.

Will you please send me the address of this company?

E. G. WERTHEIMER
Manager of Operations

Sterling Bolt Co.
Chicago, Ill.

The New Method Steel Stamps, Inc., is located at 147 Joseph Campau, Detroit 7, Mich.—Ed.

Semiautomatic Welding

Sir:

We are very much interested in an article entitled "Welding Speed Quadrupled With Semiautomatic Methods" which appeared in your July 30 issue. This article was described as automatic or semiautomatic welding by means of a powdered flux. We would appreciate tear sheets of this article in order that we may determine the source and availability of the equipment described.

R. F. CRABTREE
Industrial Engineering Dept.
Consolidated Vultee Aircraft Corp.
Fort Worth, Texas.

Index of Trade Groups

Sir:

Your Jan. 1 Annual Issue, section 7, carried an index of societies and organizations in the metalworking industry. I would appreciate a tear sheet of this material.

M. E. PADIN

Pelham Manor, N. Y.

Peening Tool

Sir:

We noted an article in the Jan. 31, 1952 issue of THE IRON AGE entitled "Peening Tool Finishes Holes Fast, Accurately" by George Elwers. Any further information you may have on this subject would be deeply appreciated.

E. J. POTTER
Foreman

Watervliet Arsenal
Watervliet, N. Y.

Information may be obtained from the Cogdrill Twist Drill Co., 12950 W. Eight Mile Rd., Detroit 21, Mich.—Ed.

Sulfuric Acid

Sir:

I would appreciate very much receiving two tear sheets of the article

"Sulfuric Acid Pumping System" found on p. 164 of the Sept. 17 issue. Our subsidiary, the Phillips Chemical Co. is very much interested in securing these tear sheets.

T. L. CUBBAGE

Phillips Petroleum Co.
Bartlesville, Okla.

Rare Earth Product

Sir:

THE IRON AGE issues of April 24, 1952, p. 129 and May 1, 1952 p. 140 carried an article about a rare earth product called "Lan-cer-amp."

As we are very much interested in this product, we would be most grateful if you could tell us which American firm produces it so that we may get in touch with them.

K. S. PAUL

K. S. Paul Ltd.
London, England

The manufacturer of Lan-cer-amp is the American Metallurgical Products Co., 3600 Forbes St., Pittsburgh, Pa.—Ed.

Turbine Rotor Blades

Sir:

On p. 112 of the Jan. 8, 1953 issue of THE IRON AGE under the heading Technical Briefs, there is an item on the machining of turbine rotor blades at Marquardt Aircraft Co., Van Nuys, Calif. Can you please send us further information of this subject?

J. G. PRITCHARD

The Rover Co., Ltd.
Birmingham, England

Materials Handling

Sir:

Will you please send us a copy of the article "Industry: The Less Handling the Better," which was in the May 7th issue of your publication? Also, will you please send us a reprint of the "Materials Handling" section of this issue which covered pp. 200 through 238?

V. R. MURPHY
V&S Product Sales Dept.

Reliance Electric & Engr. Co.
Cleveland, Ohio

Steel Secret

Sir:

We would like to obtain three or four tear sheets of your article entitled "Steel: Secret's Out, Competition Here" which appeared on p. 213 of your Oct. 8th Metal Show Issue.

J. A. WEAVER
Purchasing Agent

The Wean Engineering Co.
Warren, Ohio.



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THE **CROSS** CO.
DETROIT 7, MICHIGAN
Special MACHINE TOOLS

Fatigue Cracks

by William M. Coffey

Exercises Anonymous

Still functioning. Still mushrooming. You'll remember this is the organization of brothers who have conquered the exercise habit and have banded together to help their less fortunate brothers still trapped in the neurotic vice of exercism. These unfortunate people need help. We have long recognized that people who exercise need understanding and sympathy — not condemnation. We must look beyond the symptoms for the underlying, psychological cause. We know that none of these people have a taste for exercise. Ask any man who exercises and he'll tell you he *hates* exercise, but can't stay away from it. Our thousands of clinical reports from Exercisers Anonymous chapters all over the country prove this fact.

After years of fighting this vicious habit alone, we were naturally elated the other day to read in the papers that the medical profession is coming to our aid. Long advocates of exercise, the MP has now, evidently, done a complete turn-about and has come out for a return to the plain, old-fashioned (and lost) art of loafing for health reasons.

Two specialists told the Michigan Medical Society that Americans (or British or Germans or French or Mohicans or Hottentots) need to slow down, that a 15-minute pause in the day's duties would lead to better health and fewer mental disturbances. This, though cautious, is very welcome. And a good reminder that so far today we've done no loafing at all. We'll take care of this right now . . .

(15 minute loaf period)

. . . and we advise you to do the same.

Metal Show, etc.

We needed that little rest. Just returned from the Metal Show in Cleveland where we finally met

Jim (Upside-down) Harrington face to face. Further details on the Show can be obtained elsewhere in this issue.

Received a letter the other day addressed to IRON AGE, Western Hemisphere . . . got here, too . . . received another letter from Bryan "Pants" Murphy, of the Gustine-Bacon Manufacturing Co. . . . "Pants" is actually printed on the letterhead . . . like to get the background on that . . . our Col. R. Raymond Kay on the West Coast tells us that Donald C. Cook has been named Vice-President of the American Gas & Electric Service Corp. . . . you can add that to your collection of aptronyms . . . another letter said simply "I EKIL NORI EGA" . . . nothing else on it . . . *The New Yorker* several weeks ago carried one of their famous profiles on the dynamic David Williams, owner and publisher of THE IRON AGE in the late 1800's . . . recommended reading of a very high order . . . keep sending the renewals.

Expense Account

While making up our own Metal Show expense account we suddenly remembered the classic expense account story that a reporter turned in to his editor. Goes something like this.

The reporter was in the far north covering a search for some lost explorers. One big item was for "purchase of sled dog." Another was listed as "medical bills for sick dog." And then "funeral expenses for dead dog." And finally "flowers for bereaved bitch."

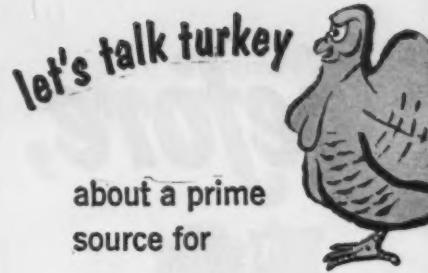
Puzzlers

Bill Braasch's apple falling puzzler poses some difficulties. Bill's answer is that the apples should be picked on the fifth day after counting at 2:00 p.m. H. M. Roberts, Lawrence Brittingham, L. F. Graves and O. R. Garrett crashed through with that answer.

New Puzzlers

Sharp M. McElwain of American Bridge submits the following and we must say that we're very happy he also told us the answer:

What is a number ending with 2 which is such that when removing the 2 from the right end of the number and placing it on the left end or as the first digit of the number, the new number thus formed will be equal to exactly twice the original number? Phew!



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We're alert enough

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Try us and see if you don't like the way we serve you—phone MU 6-2595 to discuss your particular requirements . . . or write

R. D. Werner Company, Inc. Dept. I-2
295 Fifth Ave., New York 16, N. Y.



before, ~~20~~ minutes...



now, 6 minutes

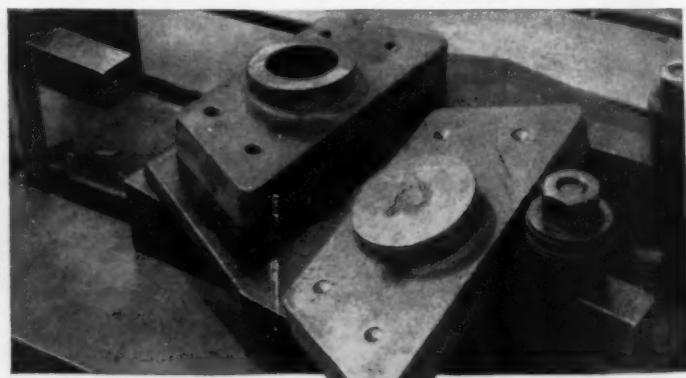


The outstanding performance of this Cincinnati Bickford Super Service Radial Drill brought approximately 50% cost savings at David Round & Son, Inc., manufacturers of cranes, hoists, winches and trolleys.

For example on the 4 ton steel trolley sides the time on drilling and reaming fell from 20 minutes to 6 minutes.

The right Cincinnati Bickford Super Service Radial Drill may effect parallel savings in your shop—Investigate.

Write for Catalog R-29.



CINCINNATI
BICKFORD



RADIAL AND UPRIGHT DRILLING MACHINES

.....
THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

THE IRON AGE Newsfront

DON'T BE SURPRISED if the Administration suddenly boosts budget requests for defense. The meat-ax technique has alarmed some top Republicans. Losses at the polls next week might be all they need to win their point.

A SECOND MAJOR ALUMINUM PRODUCER is installing a mill for electronic induction welding of aluminum tubing from strip. Foundations are in for the project which will be used for high speed welding of 2 in. rocket projectile tubes.

GOVERNMENT DECISION TO OPEN-END SCRAP EXPORTS for the balance of the year is bothering some consumers. They fear exports plus seasonal slowdown in collections may add up to shortage. It's doubtful enough material will be exported to become an important factor. Reasons are cost, licensing procedures, and time.

SOME ALUMINUM EXECUTIVES FORESEE eventual distribution of 30 pct of all aluminum mill products through warehouses. Last year's total was 14 pct. Reason: Warehouses are in closer contact with the small users mills cannot serve economically.

FREIGHT ABSORPTION is not likely to become a dominant factor in the steel market for at least several months. Present absorption practice is far different from the old basing point system. In addition to legal obstructions, higher freight rates will tend to bar all-out absorption.

ALLOY PRODUCERS WITH AN EYE ON THE FUTURE are stepping up research on low sulfur and leaded steels. Interest in chemical composition and structure is partly due to the desire to achieve greater machinability for high speed fabrication.

WATER SHORTAGES, worst bugaboo for aluminum producers in 1951 and 1952, are not expected to seriously cut output this year. While some shortages exist in the Southeast, aluminum production hasn't been hit. Situation is tight in the Northwest and steam power has been used to prevent curtailment.

FIRST ORE FROM CERRO BOLIVAR, U. S. Steel's South American mining operation, will be shipped about the first of the year. A high frequency radio network is being used to tie in operations from the mine, along the ore route to tidewater.

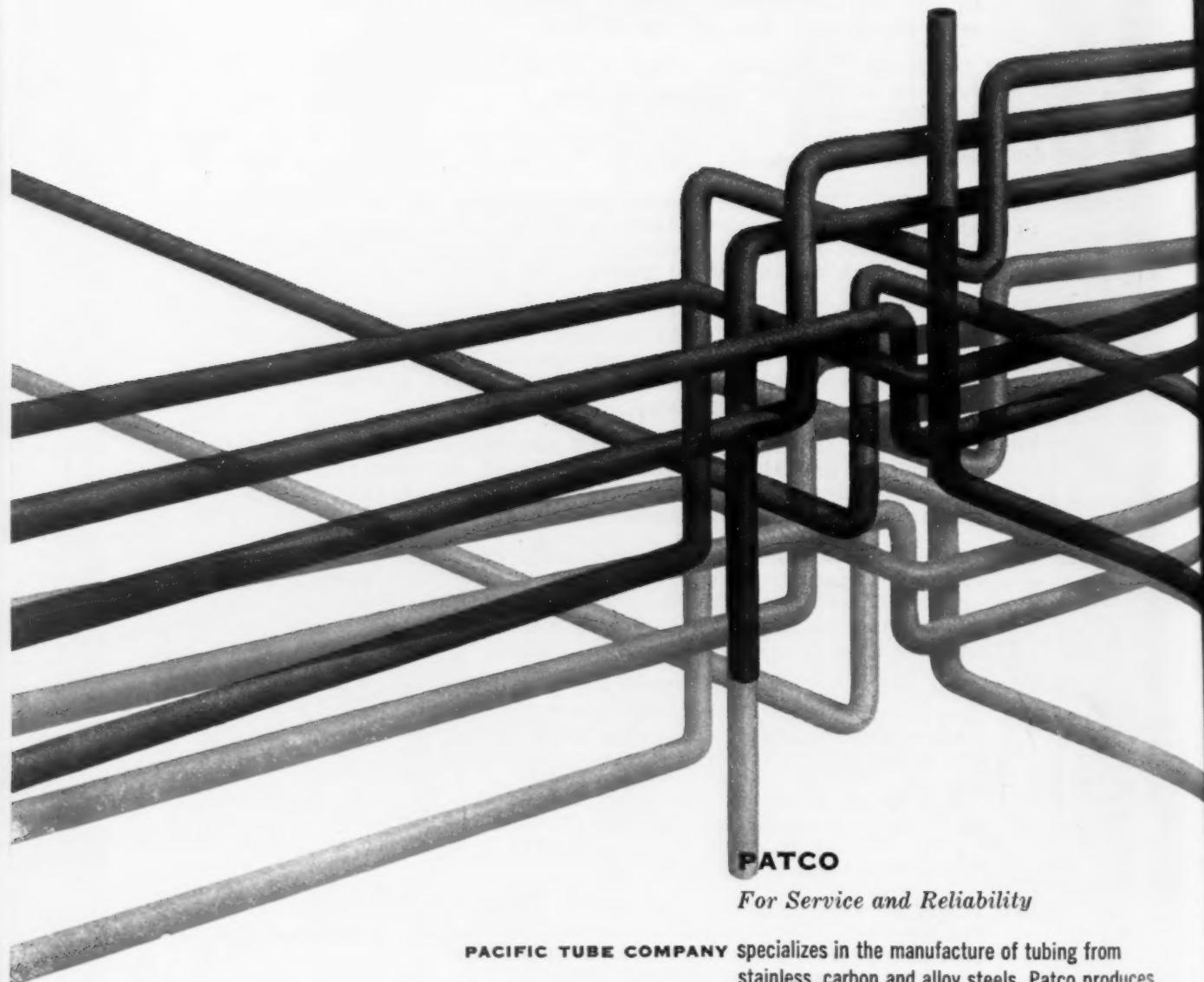
SALES DIFFICULTIES most automakers find themselves in today is bringing an autumn windfall to the advertising business. Most auto companies are increasing fourth quarter budgets to stimulate cleanup sales.

ANY STEEL INDUSTRY AGREEMENT on Guaranteed Annual Wage in 1954 is doubtful. United Steelworkers will present potent arguments for it in next year's negotiating sessions. But it probably will be lost in the shuffle, particularly if the union wins attractive concessions on social insurance and retirement benefits.

RUMORS HAVE FLOODED OUT in wake of a recent discussion on the possibility of auto independents joining forces to make interchangeable parts. Most significant is the possibility of two companies combining forces to tool up for a new V-8.



THE LIFE BLOOD OF INDUSTRY FLOWS THROUGH STEEL TUBING!



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For Service and Reliability

PACIFIC TUBE COMPANY specializes in the manufacture of tubing from stainless, carbon and alloy steels. Patco produces cold drawn seamless tubing, welded tubing, and cold drawn bars. Write for our catalog.

PACIFIC TUBE COMPANY



5710 Smithway Street, Los Angeles, California

West Coast Representatives for Superior Tube Company, Norristown, Pa.

FOUNDRY: Automate for Output, Morale

Cleaner, easier working conditions pay many dividends at Ford's Cleveland foundry . . . Boost output, morale, safety . . . Attract better grade of labor—By R. M. Lorz.

In Cleveland recently a movie audience murmured approval as they watched a sportshirted worker pouring molten metal in an automated foundry. When the lights went up industrialists, club men and civic leaders eagerly filled out cards requesting a repeat performance for special interest groups.

Gets Better Labor

As the gospel of automation spreads in this manner, foundrymen say better workers are coming to employment offices in search of jobs. Although the pure mechanics of automation often get more attention, foundrymen aren't overlooking the human equation. They realize automation can be used as a positive labor recruiting tool.

This awareness has resulted in wide use of the daily press, television, radio and other systems of mass communication. Presentation of the foundry story has already had a definite effect on the changing profile of the average foundry worker. Many shops state flatly that the "weak mind, strong back" stigma is a thing of the past.

Cleaner, less-taxing working conditions, they say, are now attracting intelligent high school graduates. Increased emphasis on streamlined production and quality control are also luring more men with college degrees. Foundrymen glancing over their shoulders into the very near past say this is a radical change.

Ford Is Model

Until recently foundry workers were at the bottom of industry's social ladder as they ground out a living in dusty, man-made infernos. Thanks to air conditioning,

dust collection and automation these same men could now be mistaken for lathe hands or tool makers at the end of their working day. Gravitational conveyors, monorail systems, adapter hoists, mechanical roll-overs, giant nullers and modern melt cranes have eliminated most of the dirt and back strain.

Although many foundries readily admit they haven't become completely automated, most express the hope that they can soon move in that direction. Ford Motor Co. is one firm which has pulled out every mechanical stop to make its Cleveland foundry a model.

Start With Sand

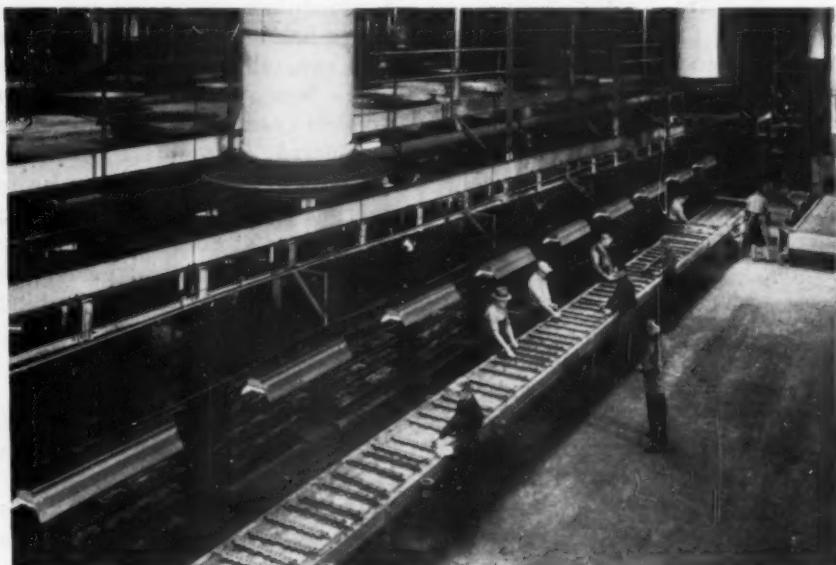
The Brookpark Plant is an acknowledged showpiece in the industry. Workers in this foundry start their day in spacious, completely air-conditioned locker rooms equipped with up-to-date facilities. Visitors familiar with yesterday's

foundry immediately sense the absence of that acrid foundry "smell."

Out on the floor oldtimers point first to huge air ducts which circulate 3 million cu ft of air per min and a complete change of air every 12 minutes. The plant circulates 7000 gallons of water per min to carry off dust and grime. To the employee this means comfortable atmospheric conditions and better morale. Back in pre-automation days foundrymen worked in a choking red haze that billowed from melting cupolas.

Experienced foundrymen at Ford say muscle saving and better conditions in their plant start with sand. Storage bins hold almost 55,000 tons which are delivered to nullers by overhead conveyors and to core making machines by a pneumatic system sensitive to push button control. Completely automatic preparation and delivery of sand does more than eliminate shovel work. It also erases many handling bottlenecks which formerly cropped up because mixtures varied.

Although they can't look back to



CORE ROOM of Cleveland foundry shows assembly of six-cylinder head cores.

STEEL: New England Mill Gets Hotter

Fast tax writeoff expected this week . . . ODM admittedly impressed by Ebasco case . . . Waives specifying site at present . . . Three areas under study for electric furnace melt shop.

Backers of a projected steel mill for New England stand a good chance this week of gaining one of their major objectives—granting of a fast tax writeoff.

Office of Defense Mobilization officials are frankly favorably impressed with the case made by Ebasco Services, Inc., for a 300,000-ton, non-integrated mill to be erected at a yet-undisclosed site in New England. They have indicated to THE IRON AGE that they are now prepared to act speedily on the fast writeoff application.

Waive Specifying Site

To speed construction plans for the mill, ODM has let it be known that it is prepared to waive—temporarily—its requirement that fast writeoff applications specify

the geographic site or sites involved. Ebasco points out that it was called in on the project only 6 weeks ago, therefore cannot take a position on so important a point as plant site until it has studied all details of the project thoroughly. Three major areas are under discussion:

1. Boston-Lawrence area.
2. Fall River-New Bedford area.
3. Connecticut Valley area.

ODM has granted Ebasco permission to amend its application by naming plant site later.

Total cost of the mill is estimated by Ebasco, acting as agent for the New England Steel Corp. (a corporation chartered by the New England Council), at \$34 million. Fast amortization is requested for \$26 million of this cost.

Special Report

Continued

the not-so-good old days, high school students who tour the Ford foundry won't be driven away by the once forbidding shakeout operation. In older foundry systems shaking red hot castings from mold to floor was a back breaking job. Workers usually wielded a three-tined fork to move castings along for cooling. Heat and dirt were considered unavoidable evils.

Students watching the operation at the Brookpark plant see even the largest castings pneumatically tipped onto a waist-high platform; then picked up automatically for cooling. Complete operation takes place under a large exhaust hood which draws off most of the heat and fumes. In the cleaning department pneumatic roll-overs and specialized hoists do away with manual handling of castings.

In the molding department the story is the same. Workers stand on a moving platform synchronized to steady and continuous delivery of molten metal from pouring ladles

to molds. Spillage and heavy work are minimized by mechanical ladle control. Here, the exhaust duct is most needed.

This pouring system is a far cry from traditional batch pouring which usually took place on the foundry floor during the last hour and a half of each shift. Pouring was generally restricted to these hours because fumes were such a problem continuous casting was considered out of the question. Transfer of metal from cupolas to pouring stations has also been streamlined at Ford by individually operated melt cranes which move about 7 ft from floor level. Pushing and tugging at bull ladles is out.

No Shoveling Needed

Men who work behind hot blast cupolas also get a break. Here a crane operator automatically weighs raw materials which go into the charging hopper. Everything is done with controls. Shovels are not necessary. Visitors are particularly

Present plans call for the construction of two electric furnaces. Both are to use an all-scrap charge. Finishing facilities are to include sufficient rolling equipment to process "the bars and rods and other steel products needed by the metalworking industries of New England." Neither blast furnaces, coke ovens are planned.

On The Right Track

Granting of the "birth certificate" by ODM will mark a milestone in longstanding plans of New England industrial groups to erect a steel-producing plant in the area. Plans for erecting an integrated mill were abandoned last year as overly-ambitious when sufficient financial backing for such a project proved to be lacking. ODM feels that the council is now on the right track.

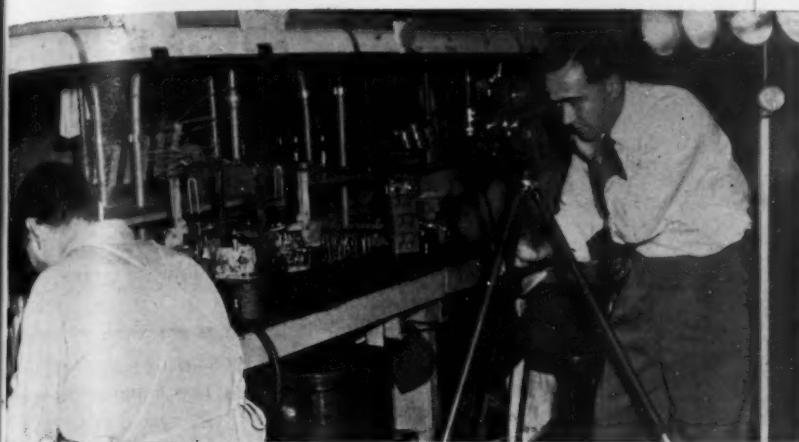
Senator Kennedy, D., Mass., has urged ODM to grant the New England application, notwithstanding the current ODM cutback on certificates that is now in effect.

impressed by the neat arrangement of giant storage bins.

Core makers also have a much easier time of it as they work with modern machinery and light alloy frames. Plant designers gave these fellows another break by locating baking ovens at a reasonable distance from machines. In some older foundries core makers often had to work with the scorching heat of ovens directly behind them.

All of these operations at the Ford foundry are carried on in a building which boasts 1,022,000 sq ft of floor space. Spacious aisles mean fewer accidents. At the Ford foundry there has never been a serious burn or back injury time loss in almost 2 years of operation. While setting records like these workers who file through Ford's modern cafeteria put their stamp of approval on automation by saying, "We never had it so good."

Foundry operators are advertising improved conditions so that their sons will feel the same way.



MOVIES: Let Camera Find Output Flaws

New twist to use of celluloid in industry . . . Time-lapse photography reveals flaws of long-term manufacturing phases . . . Sound track device for industry—By K. W. Bennett.

Producers of cameras, projectors predict that within a decade the bulk of moving picture equipment will be going to celluloid-conscious industry. This equipment will find numerous new uses and be put to fuller employment instead of gathering dust on stock room shelves between company movies or studies of manufacturing processes.

As IRON AGE described in its July 16, 1953, issue, industrial movies are doing a significant job in selling the company, its products, and as a training medium. Another traditional use of the camera is to study production processes.

Time-Lapse Movies

One of the newer angles for keeping the camera at work is time-lapse photography. Here the camera is set to take pictures at intervals of a minute or so. Secret of materials handling or manufacturing steps show up on the projection screen.

How does time-lapse photography work? Simply and automatically. Executives need not develop eye-strain trying to spot the flaws of a long-term manufacturing phase. A case history reported to IRON AGE follows:

A company was having trouble

with its materials flow. The production department, charged with scheduling lift trucks moving materials about the building, claimed the elevators were at fault. The building department, in charge of elevators used by the tow trucks, claimed the production party didn't know how to schedule its tow trucks.

Both Parties Wrong

In the absence of proof, passing the buck was adroitly accomplished by each department. Then an engineer planted a movie camera with electric drive in front of the elevators. The camera, operating automatically, took one picture, or frame, each minute.

After 8 hours the film was developed and production and building departments could tell to the minute how long trucks had to wait for the elevators, or vice versa. The upshot: both production and building departments made some scheduling changes. The time-motion study cost the price of one roll of film and processing.

An airline is using time-lapse photography to determine rush hours at its reservation windows, will stagger employee work periods to have the greatest number of employees available when the ticket business is at its heaviest.

A repair firm, hassling over the

time workmen spent at the stock room window waiting for parts, installed a time-lapse setup. A picture every minute told how long each workman had to wait. The stock room decided its delivery needed speeding up.

A large jet engine manufacturer uses a time-lapse movie camera to check jet engines under test. The camera records instrument readings on 30 different gages simultaneously at intervals of 1 to 4 minutes. These records can be studied after the engine has come off test and can even be shipped with the engine.

For best results, time-lapse photography requires two special camera attachments—an electric drive and timing mechanism, available at about \$175. A 16 mm movie camera, with standard attachments, costs from \$300 to \$700.

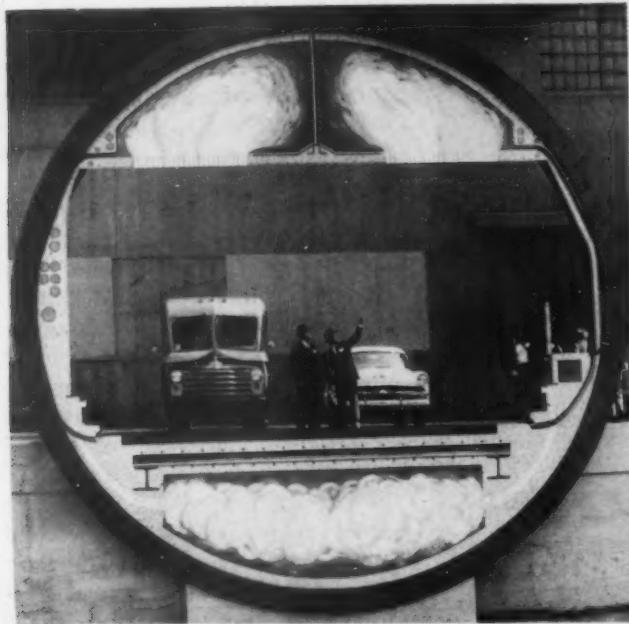
Sound Track Magic

High speed photographic equipment is well-known in industrial use and has been used to study the action of machine tools, circuit breakers, and other equipment which move at high speeds. On the screen in slow motion, machine operation too swift for the human eye to follow can be easily studied. High speed photography requires special cameras, however, and these cannot as a rule be used for other purposes.

Giving a boost to industry's use of film as a selling and demonstration medium is a recently introduced sound projector which enables a company to add sound to its films. Like a tape recording, the sound track can be erased and a new track substituted on the old film merely by running it through the projector while recording a new sound track.

Several Screen Messages

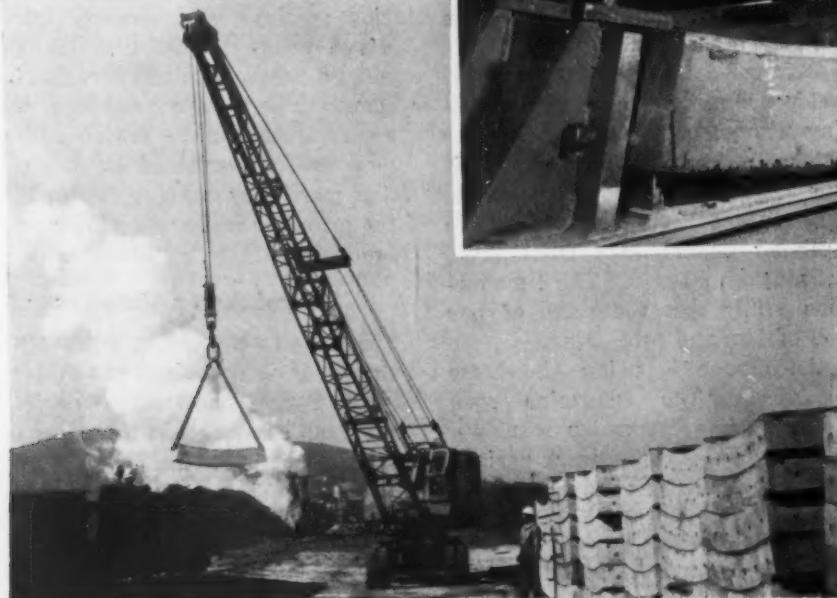
One producer of heavy equipment already is using this sound projector in South America to fit different Spanish dialects into a single edition of sales film. The South American dealer translates the English sales message into local dialect by running it through the sound projector.



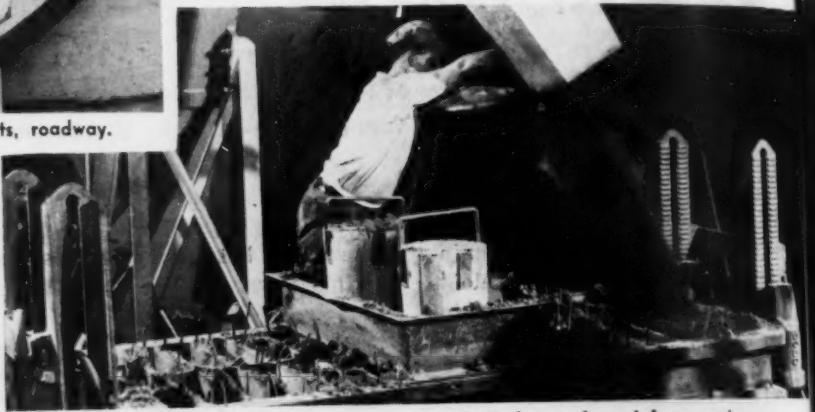
CROSS SECTION is simulated showing ducts, roadway.



LOWERED drag completes sand mold.



SEGMENTS are piled up to await shipment to the tunnel construction site after close inspection by Port of New York Authority engineers.



POURING sand to form segment mold. Rods are for reinforcement.



MILLING a ring segment in machine shop. Close tolerance is a must to permit an extremely tight fit when parts are bolted together to form tunnel's strong outer casing.

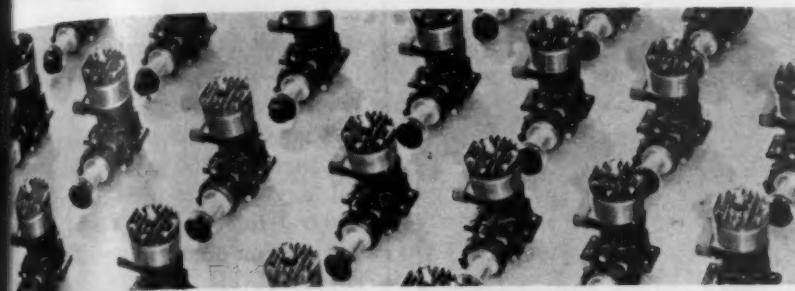
Build Tunnel, Piece by Piece

Bridges or tunnels—it makes little difference to Bethlehem Steel Corp., it'll tackle either. Last week, engineers of the Port of New York Authority visited Bethlehem to check up on progress of cast iron and steel segments for the third tube of the Lincoln Tunnel.

They saw how the complex job is done from the foundry to the machine shop.

The 7944-ft tunnel will use more than 28,000 iron segments and some 1800 steel ones for points of higher stress. About 10 pct of them are tapered to provide for bends in the tube.

Ground was broken for the new tube last year—but you won't be able to drive through it until 1957.



ENGINES: Lilliputs Teach Precision

Blessed by the military, model planemaking boosts demand for precision miniature engines . . . Industry is reservoir of accurate metalworkers, machines—By R. L. Hatschek.

As a boy you probably built at least one model airplane, powered it with twisted rubber strands. But your son's model effort is probably powered by a precision miniature internal combustion engine.

Production of these model engines is a little known but interesting segment of the metalworking industry. More than that, the field is a training ground for precision workmanship and a reservoir of facilities for close tolerance defense subcontracting. Only the best of machine shop practice and ingenious special tooling and production methods can meet requirements. And these skills must be refined to a high degree.

Teaches Many Lessons

The model aviation hobby is sanctioned and actively supported by the Air Force and the Navy's air arm as an excellent training ground for America's youth. Through it, boys and young men become familiar with aviation and rudimentary aerodynamics as well as basic principles of precision machinery.

End result, the services feel, is a stronger aviation industry and personnel better adapted to military aviation training.

Competition is keen among manufacturers of these midget powerplants and, in general, they are turning out vastly improved products at lower than prewar prices. Engineering advances have raised power to weight ratio from

about 0.3 hp per lb in the mid-1930's to some 1.5 hp or more per lb of engine weight today. This is considerably better than full size piston aircraft engines, and about ten times better than your automobile engine.

These midgets are far more rugged and less cantankerous than earlier versions. Prices for comparable engines are down an estimated 25 pct over the same span of years.

Reason is increased demand and the precision mass production methods that naturally followed. Outline of a typical firm, McCoy Products Co., Culver City, Calif., and its production methods will tell the story.

Products range from a tiny 1.5 oz diesel with a displacement of

0.049 cu in. to a 13.5 oz "hot spot" ignition racing engine of 0.607 cu in. displacement. Former retails for \$5.95, latter for \$22.50. This also just about covers the range of the industry.

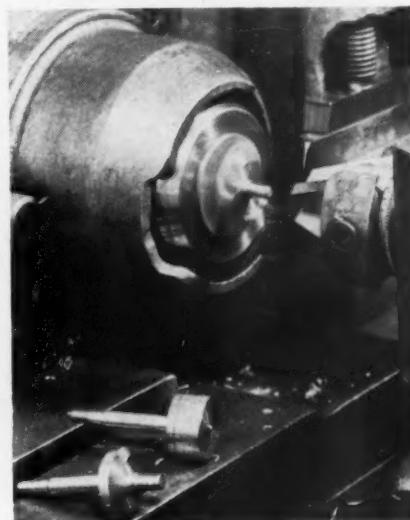
List Plant's Tools

The firm entered the model business in 1946 with a miniature race car and engine. Prior to that it had been doing precision machine work for the aircraft industry. In that first year McCoy grossed \$250,000. For '53 the company estimates gross sales will hit \$980,000; for '54, \$1,200,000 with the help of two new engines not yet introduced.

The 15,000-sq-ft plant is equipped with eight automatic screw machines, a dozen turret and second operation lathes, six milling machines, drill presses, hand and automatic honing machines, several borematics, and smaller specialized machines for grinding, lapping, and finishing parts. Many of these have been specially redesigned for use on small critical parts.

Employ 55 Workers

These machines are used with exceedingly fine accuracy. Piston and cylinder liner of the small diesel must be held to tolerance of 0.00002 to 0.00005 in. Dimensions of piston ring grooves in the larger



TURNING forged alloy steel crankshaft.



PISTON with rings, rod nearly full size.

KELLER Air Tools

for high speed assembly



ANOTHER EXAMPLE OF
KELLER Air Tools engineered to industry

Wherever parts are assembled with screws, nuts, bolts or rivets, the use of Keller Tools speeds up production, reduces costs, and makes work easier.

For example, in assembling record players (shown above), changing to Keller Air Tools made the work easier and faster, and substantially reduced production costs.

FACTS IN BRIEF ABOUT KELLER PNEUMATIC SCREW DRIVERS

Interchangeable parts

Reduce operator fatigue

Clutches, socket drivers, 45° and 90° attachments for every purpose

Weight less

Consume less air

Need fewer "back-up" parts in the tool room

Wide variety of handles, gearings, torques, speeds



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City _____ Zone _____ State _____

Production

engines are held between 0.0002 and 0.0005 in. To assure this accuracy electronic measuring instruments calibrated in millionths are used for inspection.

The plant's 55 production workers turn out 850 engines in a typical day—a rate which chews up 100,000 lb of carbon steel, 40,000 lb of aluminum and 10,000 lb of copper, brass and bearing alloys annually. This output occupies approximately 60 pct of the firm's machine time.

When the Korean war began in 1950 McCoy returned to war production, specializing in extremely precise machine parts for aircraft suppliers. This occupies the rest of the firm's capacity.

Another war-born firm, K & B Manufacturing Co., turned to lawn sprinklers, then to model engines when peace returned. A product of this company powered an American model to the world championship in England.

Economize With Special Tool

Output includes the smallest production engine in the field—a midget of 0.020 cu in. displacement. Starting in a two-car garage, plant now covers 4000 sq ft with annual consumption of approximately 12,100 lb of aluminum, 50,000 lb of steel, 8000 lb of cast Meehanite bars and 7000 lb of brass and bronze.

Tooling is standard with one exception. Built in 6 weeks for a bit over \$1,000, a special attachment was made for a 10-in. engine lathe. Prior practice required three separate operations to bore the crankcase for the cylinder, machine and spot-face the main bearing, and drill the venturi.

The attachment enables all three to be done in one set-up and paid for itself in 7 months.

While this is a description of but two firms, it is fairly representative of the industry. In time of peace, it serves to fill a market demanding high precision. In time of war, it turns to close tolerance defense subcontracting. Producers of these miniature engines have always found their abilities in high demand.

AIR RAID: Industry Asks Shelter Aid

Factory operators show marked interest in government plans to grant tax writeoffs for bomb shelters . . . Expense may hurt small firms . . . Must be in target area—By R. M. Stroupe.

Plant operators by the score are asking Office of Defense Mobilization just how the government policy on fast tax write-offs for shelter construction will fit in with their construction plans.

What has put springs under their curiosity is the recent word that Cincinnati Milling Machine Co. will be able to amortize over a 5-year period the costs of nearly \$555,000 worth of protective construction. To date, the firm is the only one which has carried through, from application to receipt of certification, on the program administered by ODM.

Withstand Four Hiroshimas

As shown in THE IRON AGE, Oct. 22, p. 83, Cincinnati Milling is well along in preparing shelters for its employees. There will be two of these, both of concrete reinforced slabs, accessible through 10-ft ramps and stairways from basements and first floors of factory buildings.

Federal Civil Defense Administration, which likes the design, says the shelters will be of the "4x" type. That is, they should be able to withstand four times the explosive force of the Hiroshima bomb, or a blast equal to that of 80,000 tons of TNT at 1 mile.

Protection Comes High

ODM is wary of predicting how many companies, including those that have placed inquiries by telephone and mail, will follow up by planning shelters. Building "bomb-proof" calls for substantial investment in structures which have no initial application to plant output.

Glove-tight budgets will prevent some companies from undertaking extensive protective construction. Small firms, especially, may not be able to meet the ODM minimum of \$25,000 on the cost of shelter areas which will qualify for write-off certificates.

Two other government requirements on which certificate-granting hinges are these: (1) The plant must be located in one of the country's "critical target areas;" (2) costs for this specialized construction must not be deductible under specific terms of the Internal Revenue Code.

The first standard may be met more often than not. Defense Mobilizer Arthur Flemming says "about one-half" of the 190 facilities rated as most critical to national defense are found in "probable target areas."

Likelihood, though, is that some changes will have to be made in the rules by which ODM awards certificates. Industry questions have already indicated the desirability of modifying the requirements to allow broader participation in the program.

Approving requests for fast tax write-off benefits is a job requiring cooperation between ODM and



SOAKING PIT expansion at Monessen Works of Pittsburgh Steel Co. is near completion as the company has brought 12 of 15 new pits into production.

FCDA. Here's the way it's handled:

A plant operator in Wheeling or Zanesville decides he wants to provide protective cover as part of a new wing of his building. Wanting to take advantage of the rapid amortization program, he calls on the local civil defense director, explains his plans, and asks for approval.

After the director gives it, the architect or engineer goes to work on the structure, following in general the design concepts outlined in FCDA pamphlets.

Still Stress Dispersion

The builder then certifies he has followed prescribed construction patterns, the civil defense director appends his own declaration that the shelter is "adequate and necessary," and the application and other documents go to ODM. There copies are prepared for FCDA review. Approval by the latter agency is required, but this action does not necessarily mean ODM will award the desired certificate.

While encouraging the building of protective structures, the government hasn't given up its argument for plant dispersion. "To the maximum extent possible," ODM says, "no important new industrial plant should be located within 10 miles of a target zone."

Attack Would Hurt

No combination of dispersion, camouflage, and protective shelters, the agency insists, can prevent "considerable damage" to the industrial machine if an enemy aerial force cold-bloodedly presses home an attack. This contention appears to be borne out in the following statement by Gen. Thomas D. White, Air Force Vice Chief of Staff:

"It is no longer possible to stop air raids by imposing heavy losses on the attackers . . . Now, because of the tremendous destructive power of atomic bombs, unprecedented losses as high as 50 or even 100 pct of the attacking force would be considered a good investment by a ruthless enemy if just a few of the bombs hit targets."

UNION: Sounds Off on Future Demands

Steelworkers gather in New York to point trends of union plans . . . Pensions lead list of four demands . . . McDonald proves skillful concert master—By W. V. Packard.

United Steelworkers of America "Operation Soundoff" was a booming success. As a sounding board of rank and file sentiment it left no doubt what contract gains the union will strive for next year. And as a unique public relations gimmick it impressed reporters with the leadership, solidarity, and enthusiasm of union leaders.

Occasion was a wage-policy committee meeting called by USWA president David J. McDonald fully 8 months in advance of contract termination June 30, 1954. Nearly 200 elected delegates came to New York to make their opinions known.

Aims Are No Secret

Economic gains they will seek for their 1,200,000 members (600,000 in basic steel) are in line with what had been predicted by THE IRON AGE (June 18, 1953, p. 91 and Oct. 15, 1953, p. 153).

There is no doubt that management will be called upon to bargain over these four demands: (1) Higher pensions, (2) more social insurance benefits—to be paid for entirely by management, (3) higher wages and (4) the much bally-

hooded guaranteed annual wage.

In addition to the big four economic demands, contract discussions will embrace a long list of non-economic matters such as union security, working conditions, seniority, grievance procedures. Contract with most steel companies expires in its entirety June 30, 1954.

Nor will the union be idle on the political front. Most significant is the shift in political action emphasis from the national to local levels.

President McDonald reasserted his determination to keep the union independent of any political party—even a labor party. Union members were alerted to be as quick to oppose "unfriendly" Democrats as Republicans. Frank N. Hofmann, legislative director of the union, admitted the union's aims on the national level had fallen short of their goals. He urged delegates to increase their work in the community and state to block laws which the union believes violate its security.

Operation Soundoff was not unlike a political convention—the orators were that good. None had

any trouble being heard without benefit of a public address system.

President McDonald was a skillful and charming keynoter, who knew just when to end the sounding off on one subject and call on another staff member to open discussion on the next.

With the mood thus established by the concert master and his number one musicians, response from the floor was fully in tune. There were no notes of discord.

Higher pension keynote was sounded by Arthur Goldberg, general counsel. He asserted, "We were pacesetters . . . in 1949, and we're going to do the job next year." Steelworkers with 25 years' service now get \$100 a month including Federal Social Security. Union spokesmen talking in terms of \$150 to \$200 per month were not unmindful of United Auto-workers agreements calling for \$137 per month.

Social insurance should be paid entirely by employers instead of by equal contributions of $2\frac{1}{2}$ ¢ per hr by employers and workers, said John Tomayko, staff technician on pensions and insurance. He also called for broader accident and health benefits, including fully paid hospital bills, increased surgical payments, and dental and medical care.

Wage increase was not specified in definite terms. But spokesmen left little doubt that ability to pay

Personnel

NEW METALS SOCIETIES PRESIDENTS, AWARD WINNERS



HONORED at the National Metal Congress in Cleveland last week were these newly-elected society officers and award winners: (left to right) James B. Austin, pres., American Society for Metals; Gerold H. Tenney, pres., Society for Nondestructive Testing; Fred L. Plummer, pres., American Welding Society; William T. Ennor, winner of ASM's Albert Sauveur Achievement Award; Hiland G. Batcheller, winner of ASM's Medal for the Advancement of Research; and George Sachs, winner of ASM's Gold Medal Award. For other highlights of the Cleveland show see p. 102.

would be used as a basis for higher wage demands. There was little doubt that economic conditions would be considered in determining the amount of increase to be sought.

Guaranteed annual wage pitch will be strong. Companies will be confronted with a limited liability plan whereby perhaps 10¢ an hr would be placed in a trust fund. Wages would be guaranteed only to the extent of the funds thus held. But there are indications the union may again be willing to trade this part of its program for concessions on pensions or social insurance.

The drive for increased pensions is expected to be determined and may become one of the prime motivations to strike if demands are refused.

Playing By Ear

Throughout the 3-day meeting Mr. McDonald acted as moderator, guiding the discussion, interjecting wit, thanking or calming delegate spokesmen.

He warned delegates against expecting too much too soon. "We can seek it (Utopia), but we'll never get it," and "Progress is hard work and attention to day-to-day detail."

It was a convincing show of union strength and solidarity, leaving no doubt that the union presentation of its case will be well polished and well understood by its members long before contract bargaining begins next year.

Proves Right to Lead

Offsetting this strong pressure management is sure to feel in the months ahead is the growing stature of Dave McDonald as a leader.

He has given strong assurance he will demand that his followers adhere to the letter and spirit of their contract — just as his predecessor the late Phil Murray did. And he has demonstrated that he will intercede to restore production when union spirit at the local level results in unauthorized wildcat strikes.

From the management viewpoint there are many things worse than a strong union.



ONE OF TWO warehouses going up at Lockheed's Marietta, Ga., plant.

Industrial Prefabs Catching On

Assembly line technique pays off in many fields—industrial buildings included. It pays the buyer in speed and economy. It pays the building manufacturer ever-increasing sales volume.

Industrial buildings constructed of standardized parts and shipped in "packages" can be erected on the desired site, may even be disassembled and moved to a new site at a later date.

These buildings are comprised of predesigned steel frame sections, roofing, siding, flashing, doors and sash. While the buyer can choose any type of roofing and siding material, constructors feel that galvanized sheets provide the greatest overall economy and meet all normal requirements for general industrial buildings.

They're designed to fit into practically any code and may be easily modified in unusual cases. Standardized buildings can fulfill requirements in all sections of the country—including earthquake regulations.

One typical line carries seven different widths ranging from 20 to 80 ft. If a wider building is needed, a number of roof sections may be used. Variations in length are as easy.

Savings result at all stages. Engineering costs are spread over many installations. Mass production yields lower unit costs from raw materials right down to erection. Parts are standard and interchangeable for all sizes of buildings. And painting of galvanized buildings isn't necessary.

Estimates place the savings at about 30 to 40 pct of the cost of a conventional masonry or brick building.

One building company president figures the delivered price of a 40 x 60-ft one-story building at about \$5000. Erected, the building's total cost would be about \$18,000. Another builder places delivered cost at approximately \$3 per sq ft, with a concrete floor, insulated double walls, doors, ventilators and windows.

Are they catching on? The industry wholesaled some \$100 million in industrial prefabs during 1952. This topped 1951 by 20 pct and was 250 pct greater than 1946. Expectation earlier this year was that the 1953 total would show another 20 pct jump.

According to producers of these packaged plants, the foreign market is ripe for picking. Imports are high and going higher as there seem to be few firms in this business outside the U. S.

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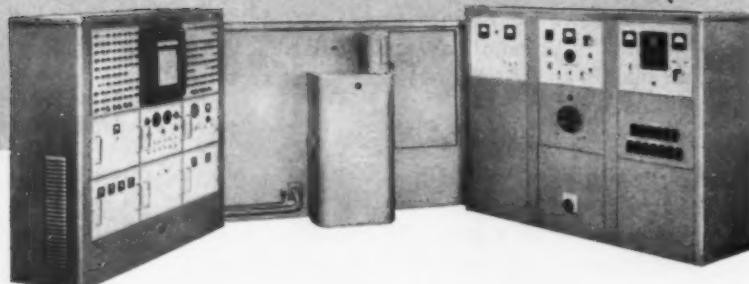
A Chemist averages 26 element determinations per day.



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Gentlemen: Please send me complete information on the ARL Production Control Quantometer.

Name _____ Company _____

Address _____

City _____ State _____

Machinery

TOOLING: 28 Pct

ASTE poll finds largest and smallest firms need most new production equipment.

Industry considers 28 pct of its production equipment obsolete, inadequate or worn out, according to a survey made by American Society of Tool Engineers.

The coast-to-coast poll was broken down into four plant size categories for tabulation: (1) Less than 250 employees, (2) 250 to 999, (3) 1000 to 4999, and over 5000.

ASTE president Roger F. Waindle points out that largest firms can more accurately determine obsolescence since they have special departments for this purpose. And the smallest plants also have a pretty good idea of their own weak points. He feels, however, that in the intermediate groups there may be a tendency to underestimate.

Who's Better Off?

Balancing the size of the largest firms against the numbers of the smaller ones, it is difficult to say which group is collectively in the best or worst shape, Mr. Waindle added.

The poll showed the largest percentage of obsolete machining equipment in the largest firms, 41 pct. Small plants averaged 28 pct, the 250 to 999 group ran 25 pct and the 1000 to 5000 plants reported the smallest percentage of outdated machining equipment at 17 pct.

Small firms indicated 33 pct of their materials handling equipment is obsolete or inadequate and large firms were almost as high with 30

How Much Is Obsolete?

Type of Machinery	Pct Obsolete
Machining	30
Inspection & Control	34
Materials Handling	28
Metal Forming	28
Production Welding	25
Grinding & Finishing	23

Source: American Society of Tool Engineers

Pct s Outdated

pet. The other groups reported 26 and 27 pct in this category.

Obsolete inspection and precision control equipment totaled 32 pct for the over-5000 group, 30 pct for the under-250 class, and only 22 and 23 pct in the intermediate plants.

Range in metal-forming equipment ran from a low of 15 pct for big companies to 33 pct in the small ones with a median figure of 24 pct for the intermediate-sized companies.

Widest spread was reported in the grinding and finishing departments—42 pct obsolete among largest firms, 25 pct in both of the small groups and only 12 pct in the 1000 to 5000 category.

Production welding equipment added up to 38 pct obsolete in the small plants with 17, 21 and 24 pct respectively reported by the other groups in increasing size categories.

Automotive

Chrysler Buys Briggs Body

After months of dickering, \$35 million was agreed on and Chrysler Corp. prepared to buy body-making Briggs Manufacturing Co. The auto industry's biggest transaction in years is subject to stockholder approval.

The sale has been rumored for years. Chrysler was a willing buyer, at a price. Recently Briggs named one. Chrysler's Plymouth Div. has taken most of Briggs' output. Packard will stay a Briggs customer at least temporarily. Later, Packard is expected to make other arrangements.

Chrysler, De Soto, Dodge all make their own bodies. In recent months Chrysler Corp. has opened new body plants in Los Angeles and San Leandro, Calif., and Evansville, Ind. The sale included 12 plants, equipment, but not Briggs' Beautyware Div. and its four plants.

Chrysler is paying over book value for Briggs. All facilities, including Beautyware, were valued at \$35,169,046 in the annual report.

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The excellent flow properties of this wire assures the desired upsetting and die forming characteristics required for efficient cold heading; longer die life; increased production; and a higher quality finished product.

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APPLIANCES: Sales Foil Pessimists

Appliance makers ignored storm warnings, kept right on producing . . . Confidence rewarded as increased selling effort moved their inventories—By K. W. Bennett.

The appliance industry is on the last lap to a good year. Sales prospects for the future appear mainly good.

Atop the boom, the appliance industry has had a happy time foiling professional pessimists who once predicted clogged-up inventories would harry future production. Warehouses may have once been overly full but appliance makers ignored the warnings, kept right on producing heavily—and then came through with the clincher of sustained high-level sales.

Sales are Climbing

At the end of the first half 1953, sales had outstripped 1952 by substantial margins. Scattered reports of a third quarter decline were plentiful—but third quarter 1953 for the large producers will be above third quarter '52. With fall sales campaigns underway and distributor inventories not at all unwieldy, sales prospects are once again bright.

In a spot check on third quarter appliance sales, estimates range from low gains to as high as 30 pct above third quarter '53. One manufacturer reported a 10 pct drop in third quarter sales against last year but added that sales had climbed sharply in September and were holding well.

Watching Inventories

Comparing sales so far this year with comparable sales last year, total sales volume increases reported range from 3.5 pct to as high as 45 pct. Washers seem to have carried a good share of this load. With the fall selling season here, prospects for the rest of the year are good.

Refrigerators have begun to pile up somewhat at the distributor level. Since the demand in this field will probably not be heavy until next spring, there has been some

worrying. This has been partly balanced by lower freezer inventories. One firm reports refrigerators as high in distributor inventories, but that freezers are 10 pct below last year. The firm expects to finish 1953 about 4 pct ahead of last year's total sales figure.

Most appliance purchasing agents report raw materials inventories as "adequate" to "a little high", and may cut back through the fourth quarter. One firm reported it could stock up a little more heavily on enameling iron. Another was in the market for some zinc-coated material. But many were talking of inventory reductions. By February, several purchasing men expected to get more cold-rolled sheet. A few indicate they should be able to order in 30-day lots, rather than ordering a tonnage for a full quarter at one crack.

Selling Efforts Boosted

Despite the fairly good market, appliance men agree this has been a tough selling year. Distributors who were caught with heavy inventories last spring, are ordering carefully as the material is needed. Competition has been keen.

Manufacturers have countered

with heavy selling and giveaway campaigns and most distributors have followed suit. And appliance firms have been adding to their lines. One firm, for instance, has added food freezers and dryers to an appliance line that already included washers, ranges, and irons.

Several have begun to build air conditioning equipment. Another firm has, in the last year, taken a plant out of defense work where contracts were being cut back and will produce refrigerators there shortly. Another has cut back on refrigerators, will add stoves to its present lines.

New Lines Help

The appliance industry trend to diversification has been one answer to giving a single distributor a complete range of appliances with a single brand name.

To a lesser extent, diversification is used as a hedge against seasonal consumer buying. Where once a single item was produced that sold heavily during the summer months, the builder adds an item that will sell during the winter.

Washers, the old standby, look good to a housewife at almost any time of the year. Dryer sales should upturn with winter and offset the cold weather dip in refrigerator business. Dryer sales this year have jumped from 33,296 in July to 70,774 as early as the end of August.

Washers, Driers Gain

Here are a few of the statistics. By the end of first half 1953, washer sales were 38.5 pct ahead of the same period 1952; dryer sales were up 15 pct; ironer sales were up 14.5 pct. Washer sales slumped in July, came back strongly in August, rising from 228,268 units in July to 291,260 units in August. Dryer sales doubled in August over July. Ironers were falling off, but vacuum cleaners were on the way up from a July low.

Despite some dark predictions, 1953 will close as a good year for appliances. For 1954, the industry is generally optimistic, will intensify selling.

"Keep out of his way today."



INVESTORS: How to Keep Them Coming

Security analysts tour Allegheny Ludlum operations . . . They like the idea . . . Firm uses usual methods, too . . . "Never let them forget you," is the slogan—By J. B. Delaney.

"Never let them forget you" is the slogan of companies seeking to keep the investment pipelines open. It's done by keeping your name, your profits and dividends, your earning potential and corporate vitality before the investing public.

Allegheny Ludlum Steel Corp. does the usual things to accomplish this—publicity, advertising, speechmaking by top executives. Continually there's a sensible amount of "selling" the company, putting more glitter into its chief product, stainless steel.

"See For Yourself"

But the cold facts of statistics, sales records, etc., are necessarily cold unless given an extra fillip. What more convincing argument could be presented to the men who mold investment opinion than giving them personal contact with the plant.

What A-L did was simple but spectacular. It took 43 New York security analysts on a 2-day "see for yourself" tour of company operations. For the analysts this was not another junket. They spent long hours tramping through the firm's three mills. They got up early, stayed late as they traveled by car and plane on a schedule timed with the efficiency of a military operation.

The letters of appreciation that have hit the desk of A-L President, Ed Hanley, since the tour indicate the analysts were sold on the tour. They asked questions, got direct answers and were loaded down with first hand information, company literature.

"I think our trip may generally result in a much better attitude toward your company and steels as a group," wrote one of the visitors.

Mr. Hanley told the analysts that: A-L could profit even if the

ingot rate should drop to an unlikely 65 pct of capacity.

Titanium Metals Corp., Allegheny Ludlum and National Lead's entry in the titanium derby, is operating in the black. Use of stainless steel in America has doubled every 10 years since 1920.

Production and sale of silicon steel, another important company product, should grow apace with the expanding electrical industry.

The company's \$80 million expansion and improvement program, begun in 1946, is nearing completion.

A-L's sales eggs are not in one basket. Its market is diversified.

The visitors saw the company's new hot extrusion plant at Watervliet and were the first group of its kind to visit the continuous casting pilot plant. This new steel process is operating successfully, with the first commercial plant being installed in a Canadian mill.

Allegheny Ludlum executives gave top priority to the touring analysts, served them as guides.



SECURITY analysts see for themselves.

At the end, President Hanley and his staff gave frank answers to their questions.

The company can already point to results. A number of the analysts have issued investment reports based on their tour.

But A-L hopes for long-range benefits, too. They figure they have given 43 persons whose opinions are valued by would-be investors, a mental and factual picture of the company and its principal operations.

These men have seen for themselves the condition of A-L plants and the results of its expansion.

How Analysts Analyzed A-L Plant Tour

Excerpts from the letters of financial analysts to E. J. Hanley, president of Allegheny Ludlum Steel Corp.:

"We . . . believe that such 'get togethers' go a long way towards cementing the relationships among stockholders, corporate entities, and the financial fraternity . . . As a result of this trip I personally feel in a far superior position to appraise the relative investment merits of the steel industry and Allegheny Ludlum Steel in particular."

"Enlightened, aggressive and intelligent management such as yours can only lead . . . to success."

"I came away with a most favorable impression of the company's modernization program, as well as the feeling that it would considerably strengthen A-L's industry position."

". . . I am also extremely impressed with the long term prospects for your company."

"I was greatly impressed by the things that are being done at A-L."

Setasides:

Reduced setasides no indication of future cutbacks.

Substantial cutbacks in the defense setasides of steel, copper, and aluminum announced last week by the Office of Defense Mobilization are not to be taken as a forecast of additional cutbacks in military and defense contracts.

Steel setaside for the first quarter is pegged at 1,466,840 tons, a 20 pct reduction from fourth-quarter 1953 allotment.

Defense requirement for copper was set at 167,316,000 lb, a cutback of 23 pct. Aluminum needs were estimated at 167,707,000 lb, about 18 pct less than for the current quarter.

These allotments represent only the quantities which are figured necessary to cover "A" product output. Amounts to be set aside at the mill level will include additional stocks for atomic energy and defense related ("B") products.

Official explanation of the first quarter reduction is that it "reflects adjustments in military sched-

ules."

Sources high in the Pentagon told THE IRON AGE that the term "adjustments" refers to past—not pending, or probable future actions.

They add that there will probably be some "negligible" chopping here and there. But as to major contract cutbacks there are no plans being considered at present which would appreciably affect present production schedules.

Actually, it is explained, the first quarter cutback results from decreased requirements because of cutbacks which have been announced, stretchouts in some production schedules, and completion, or run-out, of contracts for which there is no current need for renewal.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Manual operating system for M45 Quad. .50 caliber gun mount, 3900, \$1,604,840, Bowen-McLaughlin, Inc., Pearland, Texas. Metal parts for fuze, bomb, E34R4, 45000 sets, \$252,747, The Lux Clock Mfg. Co., Waterbury, Conn.

Bomb, $\frac{1}{2}$ lb, 50000 ea, \$55,200, Shwayder Bros., Inc., Denver, Colo.

Trucks, $\frac{1}{4}$ ton, 338, \$1,437,549, Chrysler Corp., Detroit, Mich.

Truck transmission spare parts, 717250, \$2,576,350, GMC Buick Motor Div., Flint, Mich., W. J. Brewer.

Crane, crawler, 58, \$132,530, Bay City Shovels, Inc., Bay City, Mich.

Body, igniter assy., 74720, \$163,487, Rudy Mfg. Co., Doraville, Mich.

Minature practice bombs, 225734, \$96,836, Basic Foundry Co., Washington, D. C.

Constant frequency, variable speed AC generators, 3, \$244,180, Jack & Heintz, Inc., Cleveland, Ohio, P. J. Barenfeld.

Replenishment of artillery parts, 378 pc,

\$995,126, U. S. Steel Corp., Detroit, Mich.

Small arms ammo boxes, \$1,162,900, Fleetwood-Airflow, Inc., Wilkes-Barre, Pa.

Periscope eyepieces, 150 ea., \$117,275, DACO Machine & Tool Co., Brooklyn, N. Y.

Cups, case, ctge., 404225, \$181,093, Plume & Atwood Mfg. Co., Thomaston, Conn.

Transportation

Freight:

Ask lower east to south rates for iron, steel products.

Competition from truckers is behind scheduled reductions in iron and steel railroad freight rates in the South and from the eastern territory to the South.

On basis of a study of competitive rates of truckers within the southern territory, southern railroads asked Interstate Commerce Commission permission to reduce rates on iron and steel products as much as 25 pct, effective about Nov. 5.

In turn, the eastern railroads have filed reduced rates on iron and steel products from all points in eastern territory to all points in southern territory to put shippers in eastern territory on a comparable basis with those who will benefit by the southern reductions.

The southern reductions were a move in self-defense by the railroads who have been losing iron and steel business to the truckers. Railroads in eastern territory have had to take similar measures to offset a growing trend to trucks.

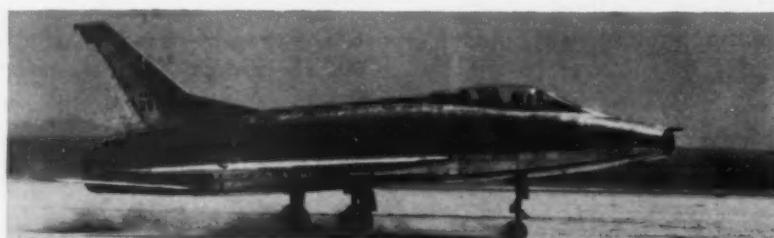
New east-to-south rates, while originally scheduled for Nov. 21, may become effective on the same date as the new southern territory tariffs. Examples of present and proposed east-to-south (Cleveland to Charlotte, N. C.) rates:

80,000 lb Rate

Present	Proposed	Reduction
\$883.20	\$608.00	\$275.20

40,000 lb Rate

441.60	336.00	105.60
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Strike Stalls F-100 Jet Output

Production was stopped late last week on the Air Force's newest jet fighter, the F-100, as CIO autoworkers walked off the job. They demanded a wage hike of 26¢ an hr. The strike spread to a plant producing the F-86 jet, which the F-100 Super Sabre replaces.

The strike began as 1000 CIO workers struck at the North American Aircraft plant at Fresno, Calif., spread to the company's plants at Los Angeles and Columbus.

Built by North American Aviation, the F-100 is designed for supersonic flight, has a service ceiling of more than 50,000 ft and a combat radius of over 500 miles.

Titanium is used extensively throughout the fighter. Other features built in to adapt the plane to high speeds include automatic leading edge slots and a low-positioned, one-piece horizontal stabilizer.

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STRAPPING ON A TRACTOR. When International Harvester ships crawler tractors on open railroad flatcars, Acme Steel Strapping ties tool boxes, lubrication equipment and seat cushions in place for the journey.



SOLE SUPPORT for these IH Diesel engines is one Acme Steelstrap per engine. It secures the engine to a pallet for easy handling.



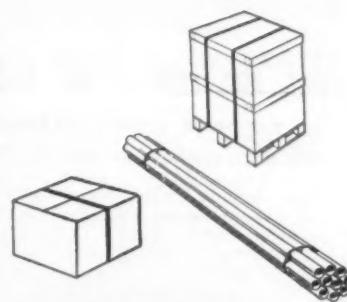
4,000 POUNDS of tractor dashboards are bundled together with Acme Steel Strapping for delivery from one International Harvester plant to another.

Whenever you receive anything secured with Acme Steel Strapping, you know that the shipper has taken care to get it to you safe. He has also beat the threat of damage-in-transit and has cut the cost of packing and shipping, too.

Acme Steel Strapping does all these things. It makes packing and loading easier and faster. It provides better protection during shipment, and

helps insure S.A. (Safe Arrival).

Almost certainly, Acme Steel Strapping or Acme Steel Stitching Wire methods can help somewhere in *your* operation. If you have any kind of a shipping or materials-handling problem, we may have just the idea you need. Write Acme Steel Products Division, Dept. IA-108, ACME STEEL COMPANY, 2840 Archer Avenue, Chicago 8, Illinois.



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Industrial Briefs

Formed . . . BEAVER DRAWN TUBE CO., Beaver Falls, Pa., newly formed company has completed installation of facilities.

New Quarters . . . MORTON BEARING CO. has moved to larger quarters at 815 Wildt St., Ann Arbor, Mich.

Expansion . . . DETROIT BRASS & MALLEABLE CO.'s expansion program will include new foundry facilities, machinery and plant-wide improvements at its Detroit plant.

Dividend Declared . . . Directors of CONTINENTAL CAN CO., INC., New York, have declared a regular quarterly dividend of 60¢ per share on the common stock.

Sales District . . . Leschen Wire Rope Div., H. K. PORTER CO., INC., St. Louis, has established a new sales district covering Texas, Louisiana and Oklahoma. Headquarters are in Houston, Tex.

Distributor . . . ALUMINUM CO. OF AMERICA has named The Hamilton Steel Co., Cleveland, as a second distributor for the area.

Parts Depot . . . CATERPILLAR TRACTOR CO., Peoria, Ill., will open a new parts depot in Denver.

Re-Elected . . . GRAY IRON FOUNDERS' SOCIETY re-elected H. J. Trenkamp, Ohio Foundry Co., Cleveland, president of the society.

On the Way . . . INGALLS SHIPBUILDING CORP., Birmingham, has launched the fourth of five Mariner type ships it is building for the Maritime Administration at its Pascagoula, Miss., shipyards.

Atlanta Warehouse . . . J. H. WILLIAMS & CO., Buffalo, will have a new warehouse at 1855 Cheshire Bridge Rd., N. E., Atlanta, Ga.

Enlarging Plant . . . MCCOLL-FRONTENAC OIL CO. LTD. will spend \$4 million enlarging its oil refinery at Edmonton, Alta.

Skyward Bound . . . American Bridge Div., UNITED STATES STEEL CORP., Chicago, will begin erection of steel framework for the Prudential Insurance Co. 41-story office building this month.

New Prexy . . . PRERESSED METAL INSTITUTE has elected Samuel P. Hull its president. He is vice-president of Worcester Stamped Metal Co., Worcester.

Plays Host . . . METALS DISINTEGRATING CO., Union, N. J., recently welcomed a group of 15 European metals exports, representing Belgium, France, Germany, Holland, England and Italy. They were taken on a tour of the plant to see advanced production techniques and commercial application of powdered metals.

Flight Time . . . GENERAL ELECTRIC CO.'s J-47 jet engines have completed more than 1 million hours of flight time.

Senior-Year Scholarship . . . UNION CARBIDE & CARBON CORP., New York, has established a senior-year technical scholarship program at 41 engineering colleges and universities.

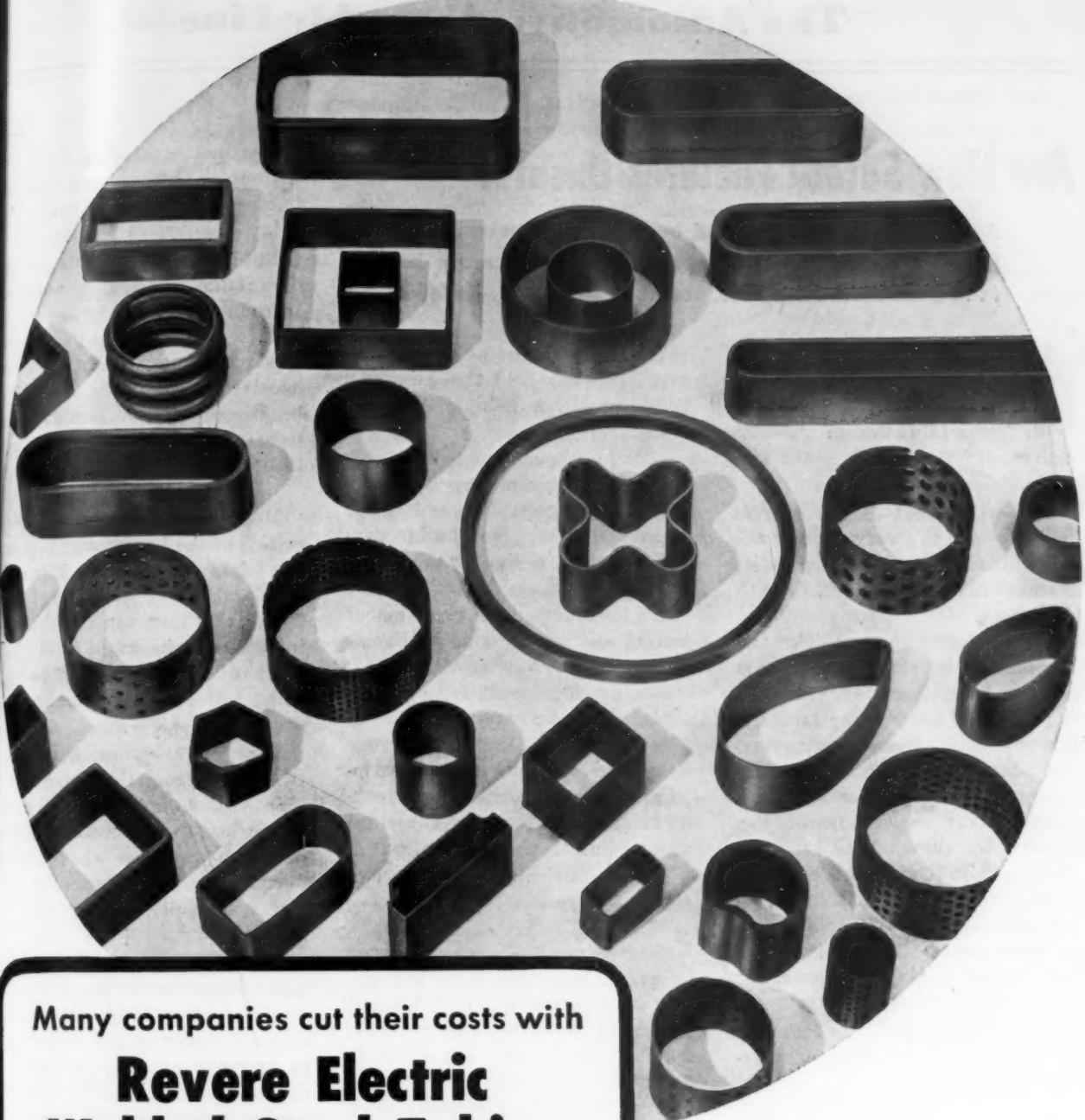
Elbow Room . . . THE MOTCH & MERRYWEATHER MACHINERY CO. has moved its Cutting Tool Mfg. Div. into new, larger quarters at 1150 E. 222nd St., Cleveland.

Happy Anniversary . . . INLAND STEEL CO., Chicago, quietly observed its 60th anniversary last week when a group of officers and directors visited the original plant in Chicago Heights, Ill.

Coming Up . . . UNIVERSITY OF WISCONSIN will emphasize modern problems in tool engineering at an Engineering Institute to be held at the University on Nov. 18-20.

Service Award . . . GAS APPLIANCE MANUFACTURERS ASSN. has given a distinguished service award to Frank H. Adams president of Surface Combustion Corp., Toledo, for his achievements as a "pioneer in the development of gas as a tool now employed in more than 26,000 industrial processes."

Sale Made . . . AIRESEARCH MFG. CO., Los Angeles, has sold 18 complete aircraft pressurization systems to Trans World Airlines for use in conversion of Lockheed Constellation transports to air coaches.



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SEE "MEET THE PRESS"
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The Automotive Assembly Line

Are New Safety Features Unsafe?

Argument grows on boosted horsepower, power brakes . . .
Industry critics claim engineering advances create hazards
. . . Automakers stress use, not abuse—By R. D. Raddant.

During the past months a controversy over automotive safety features has been building up. With traffic fatalities daily occurrences, safety itself is not a new topic.

Unusual aspect of the current issue is that the very factors the auto industry points to as safety features are under attack.

Abuse, Not Use . . . The two engineering developments that are under most criticism are the highly publicized horsepower race and power brakes. Even power steering, which is probably most widely recognized as a safety factor as well as a convenience factor, has come under some attack recently.

Obviously, there is an easy answer to any charge that engineering developments contribute to accident rates. This answer is that danger comes from abuse, not from intelligent use.

Nevertheless, the auto industry frequently feels called upon to defend itself.

Where They Disagree . . . Charles A. Chayne, General Motors vice-

president in charge of engineering staff, recently told the American Assn. of Motor Vehicle Administrators:

"While we continue to seek new methods of minimizing crash injuries, we regard it as even more important that we build cars which make it easier for the driver to stay out of accidents."

He lists power steering, power brakes and accelerating ability as outstanding safety assets.

But just as recently, Paul H. Blaisdell, public safety director of the Assn. of Casualty & Surety Companies, warned that development of aids to drivers has outdistanced the motorist's mental adjustment to their use.

There, basically, are the two sides of issue.

Short Stops . . . Taking power brakes as a sample case, this recent development has been blamed for many accidents. They result from a driver stopping so suddenly that passengers are thrown against the dash or windshield or from being hit from the rear by a car unable to stop so quickly.

These instances could mean only a bump on the head or a scratched bumper. Or they could mean something a lot more serious.

But Mr. Chayne points out that one of the principal objectives of introducing power brakes was to reduce the time required for the driver to remove his foot from the accelerator and to apply the brakes effectively. Power brakes, used properly, he says, will help to do this.

Horsepower Can Help . . . Most critics of the horsepower race just can't buy the idea that increasing acceleration is a safety factor. They ask, "How can the ability to increase mph rapidly at high rates of speed possibly be anything but adding to danger?"

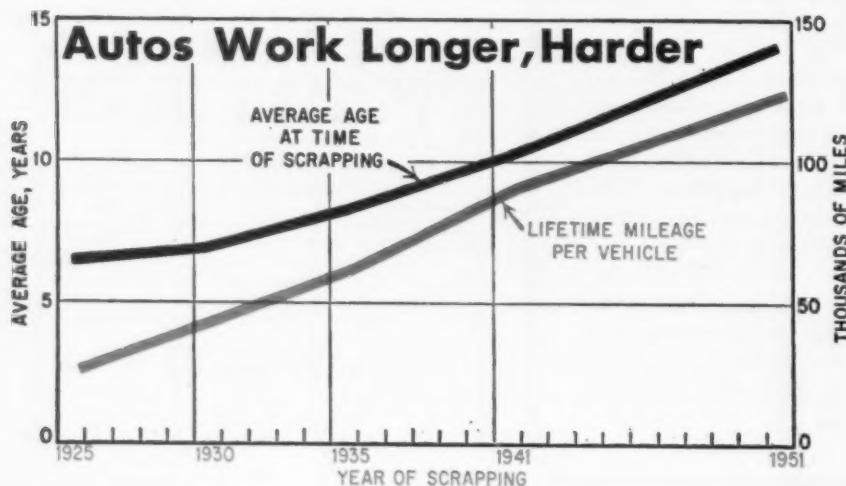
Mr. Chayne says accelerating ability is "an asset in at least two ways from the safety viewpoint." First is to reduce the time a car has to be on the left side of a two-lane road when passing. Second is to get automobiles moving more quickly away from intersections.

Technical reasons for boosting horsepower are to improve acceleration by providing a better ratio of horsepower to car weight and to increase gasoline mileage and decrease engine wear by reducing engine revolutions per mile.

Fear Belt Disinterest . . . Possibility of adapting safety belts similar to those used in airplanes has also been talked about frequently. Hudson's experimental car, the Italia, was equipped with these devices.

William W. Harper, a California physicist-consultant on auto accidents, recently reported that only 10 to 20 pct of auto injuries are caused by crushing of the passenger space. Remainder are the result of the passenger being thrown against the inside of the car or out of it entirely.

That no standard auto has seat belts doesn't mean that they have



not been considered by probably every auto manufacturer. But the public just isn't interested. Almost every driver can see the benefit of a seat belt, but most realize they would be reluctant to take the time to buckle one on for ordinary trips. Furthermore, who could make an active child sit tied to his seat, regardless of how good the idea might seem?

Chrysler Adds Hp . . . Chrysler took over leadership in the horsepower race this week, introducing 1954 models powered by 235-hp FirePower engines.

Raising the power of the New Yorker DeLuxe and Imperial models from 180 to 235 hp is the most significant change in Chrysler lines this year. In jumping the power and torque, Chrysler regained the top in the power ladder.

In other Chrysler models, the New Yorker's V-8 engine was boosted from 180 to 195 hp and the Windsor DeLuxe models will continue to be powered by Chrysler's 6-cylinder Spitfire engine.

Lot Left Over . . . Chrysler contends that even this substantial boost in power and torque, from 312 to 330 lb-ft, "takes advantage of just a portion of the power potential of this engine."

Turbines:

Injury to auto executive spotlights hush-hush experiments.

Almost everyone close to the auto industry knows that somewhere in or near most research sections lurks an experiment involving a gas turbine engine.

This type of hush-hush project was spotlighted recently by a GM Proving Grounds accident involving Charles L. McCuen, GM vice-president and general manager of the Research Laboratories. (THE IRON AGE Salutes, July 24, 1952.) Mr. McCuen, driving alone, crashed through a guard rail when his car went out of control.

Officials would admit only that Mr. McCuen was driving "one of the many experimental cars" at

the proving grounds, but it was generally believed the car was powered by a gas turbine engine. Cause of the accident was not immediately established while the GM executive made "slow progress" in recovering from head injuries.

No Mechanical Failures

It was learned by THE IRON AGE, however, that there were no structural or mechanical failures in the car itself or the power plant. Mr. McCuen is an experienced test driver and reports that he was driving at more than 100 mph were discounted as "ridiculous."

That GM has been working on gas turbine engines has been known for some time. Ford has made no secret of its gas turbine engine project, although progress has been closely guarded.

Most engineers are convinced that the gas turbine has a future in the auto industry, but probably in trucks or buses, particularly for long distance hauling. Idling, slow speeds, and acceleration pose problems of high fuel consumption that are difficult to overcome.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Oct. 24, 1953	129,947*	19,394*
Oct. 17, 1953	127,725	24,918
Oct. 25, 1952	113,114	31,633
Oct. 18, 1952	106,277	31,811

*Estimated: Source Ward's Reports

GM Resumes Hydra-Matic Output

Production of Hydra-Matic transmissions was resumed Oct. 21, first since fire destroyed GM's Detroit Transmission plant Aug. 12. First units came off new assembly lines at the old Riopelle plant which had just been abandoned for the new building in Livonia before the disastrous fire.

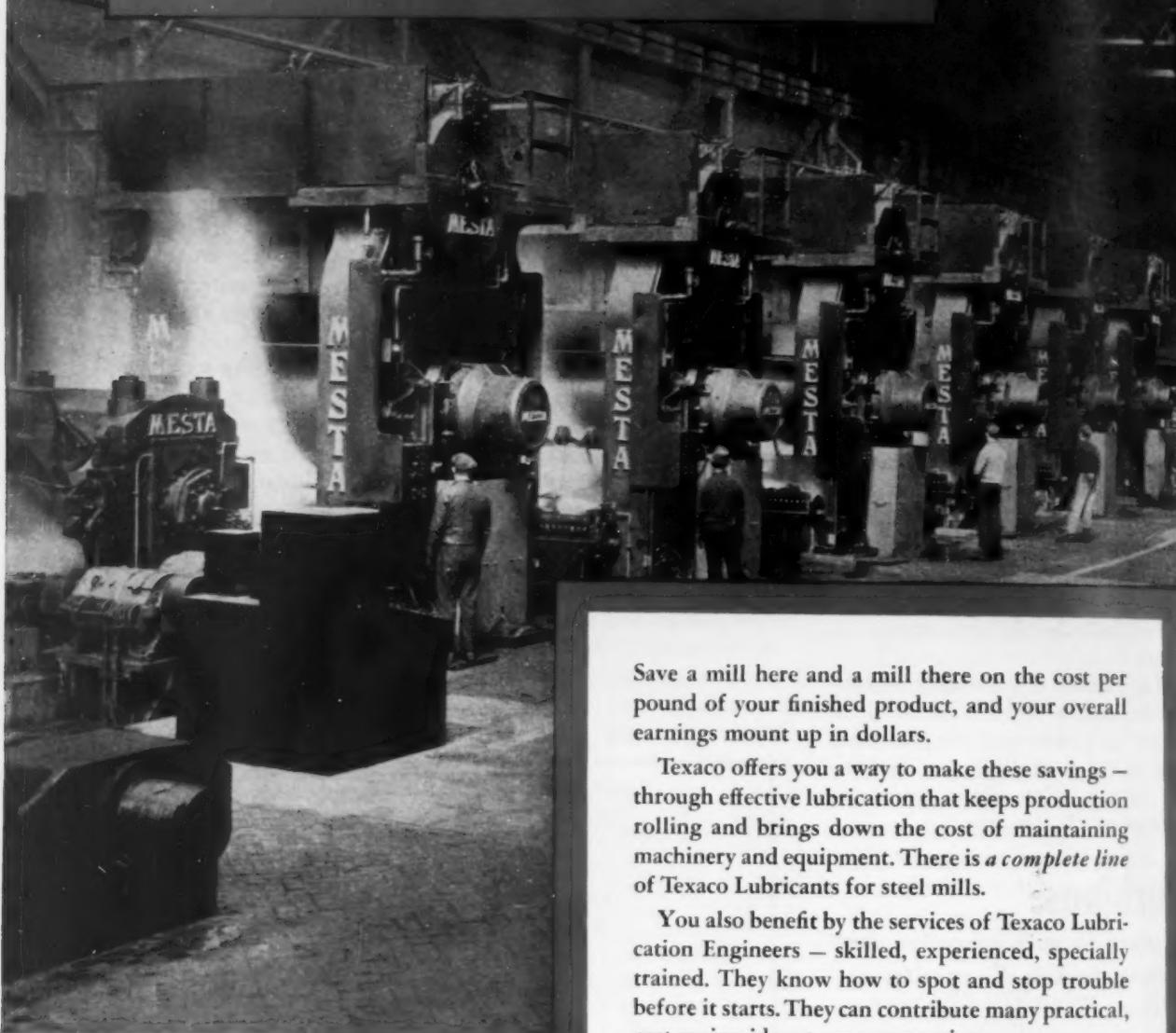
The Riopelle operation is exclusively assembly of Hydra-Matic parts produced in GM divisions and by outside suppliers. It is separate from the Willow Run operations where GM is rushing manufacturing toward a goal of production in November. Production at the Riopelle plant will reach 1200 a day by November.

THE BULL OF THE WOODS

By J. R. Williams



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This Week in Washington

See Shifts in Stockpile Program

Latest uproar on U. S. stockpiling practices may result in new policies . . . Lead, zinc industry claims imports are not needed, are driving U. S. firms out—By G. H. Baker.

More juggling and revision of the government stockpiling program may be expected from the latest investigation of charges ranging from unjustified foreign purchases which injure U. S. industry to allegations of purchase of inferior, unusable materials.

A continuous chain of officials, starting at the top with Interior Secretary McKay and GSA administrator Mansure, have been summoned for "informal discussion" with a subcommittee staff directed by Sen. George W. Malone, R., Nev. Whether full-scale hearings are to be ordered depends on the outcome.

Has It Hurt? . . . Particular attention is going to charges that shoddy materials have been palmed off on stockpile buyers. But a substantial portion of the inquiry is on allegations that materials have been imported when domestic materials could have been purchased.

Biggest commotion is over lead and zinc. Industry spokesmen say stockpiling and reciprocal trade policies are forcing American producers out of business. Bureau of Mines estimates commercial reserves at enough lead to meet all needs for 11 years and enough zinc for 18.

Emphasize Americas . . . Others say that even though sizable quantities of strategic materials must be imported, particularly to supplement our own reserves, it would be better to give more preference to purchases from Western Hemisphere nations.

Bureau of Mines says it is likely the three Americas could become self-sufficient in most strategic materials — if the U. S. switched

the money it is spending elsewhere to this side of the Atlantic.

Sen. Malone argues that any amount spent within the Western Hemisphere would still be cheaper than the cost during the last war when "up to seven ships out of every ten" loaded with strategic materials were lost.

More Monopoly Laws . . . Tougher antitrust laws may be in the offing. Attorney General Herbert Brownell, disturbed at the huge backlog of unfinished "monopoly" case inherited from the Truman Administration, wants Congress to write some teeth into basic antimonopoly statutes.

Mr. Brownell isn't ready to disclose what specific "teeth" he wants Congress to provide. His formal recommendations won't go to Capitol Hill until Congress reconvenes in January. But both the Attorney General and Judge Stanley N. Barnes—head of the Justice Dept. Antitrust Div.—are agreed that they would like to

have authority to subpoena records, documents, and other data in the preparation of civil antitrust cases against firms accused of monopolistic practices.

Now Limited . . . At present, subpoena authority applies only to criminal cases. Other regulatory agencies of government—such as the Federal Trade Commission and the Securities & Exchange Commission—now are permitted to exercise subpoena powers in civil cases.

Judge Barnes already has made a sizable dent in the backlog of pending antitrust cases. As of July 1, 143 such cases were listed as "unfinished business." Of these, 54 were more than 2½ years old. In the past 3 months more than 17 cases have been settled—most of them by consent decree.

Cut 5 pct Business . . . Washington "influence peddlers" have found the contract pickings very slim under the Eisenhower Administration. But dwindling awards of government contracts put some firms under pressure to use "last resort" methods.

General Services Administration, biggest buyer (outside of the Defense Dept.) of government supplies, made it clear last week that it would have no truck with "influence peddlers."

Mr. Mansure makes it clear that he is not talking about "legitimate salesmen or representatives who earn their living in pursuits long recognized by everybody as honest and honorable parts of the trading process." A "five-percenter" is not necessarily a wrongdoer. Commission agents are an accepted part of industrial selling. But if the term means "influence peddler," then there is something definitely wrong, and GSA will refuse to do business.

Sympathy . . . Planners show signs of sympathy for the machine tool industry's bid for permission to





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WATER-SOLUBLE, ALL-PURPOSE CUTTING BASE

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Ready to give you
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channel a greater proportion of their output to non-defense uses. But they drop no hint as to whether or not—or when—they'll grant the industry request.

Industry spokesmen point out to the Business & Defense Services Administration that slack business exists in a number of plants, and that DMS Order M-41 should be accordingly amended to permit sale of more than 40 pct of their tool production to non-defense buyers.

Order M-41 requires that tool builders deliver 60 pct of their output to fill defense-rated orders for one classification. Only 40 pct of production may be diverted to non-rated orders.

Atom Plants:

Westinghouse will construct first atom power plant.

Initial steps have been taken toward building the nation's first atomic power plant, but it may be 15 years before the average homeowner can afford the current for his reading lamp and appliances.

It will require at least 3 years to complete the plant. Cost of the power generated will be about four times that of ordinary electricity and it may take a decade to pull the cost down.

Westinghouse Electric Corp. has been picked by the Atomic Energy Commission to build the first full-scale atomic power plant. It is to have a minimum capacity of 60,000 kw, enough electricity to supply a normal city of 100,000.

In choosing Westinghouse for the job, AEC passed up temporarily a somewhat similar offer by General Electric. This was a proposal for a fuel-reactor plant to produce both plutonium for weapons and power for commercial or other use.

Not for Defense

But the AEC is now in a position to take care of foreseeable needs for plutonium and does not believe it is "justified in encouraging dual-purpose reactors" at this time.

This means that now that AEC

has decided to go into atomic power development in a big way, it will concentrate on commercial uses.

Westinghouse was selected, the commission explains, because the firm is already familiar with the reactor system which the government wants. This is the basic reactor design proposed for Navy ship propulsion, but which has now been postponed.

Decision to use this type reactor, says AEC Commissioner Thomas E. Murray, was made largely because it is much farther along than any of the other types studied.

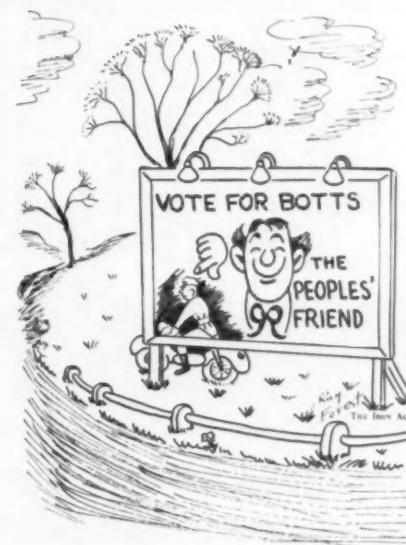
Direct supervision of the job has been turned over to Rear Admiral H. G. Rickover, Navy reactor expert, who has been closely associated with Naval reactor projects.

One reason for the decision to go ahead with industrial development of atomic power immediately is frankly explained as another move in the Cold War.

It will cost a lot more now than it would a few years in the future, but AEC believes the cost will be more than offset by the prestige gained in showing the world that the U. S. is not hoarding its nuclear knowledge for military purposes.

Welcome Risk Capital

Cost of atomic power projects is clearly still beyond the ability of private industry to pick up the entire bill. In this particular instance the tab is likely to run as high as \$40 million or even \$50 million.



But, the commission says, it will welcome private risk capital in the building of steam and turbine portions as well as operations of the plant.

This is interpreted in some quarters as a gentle hint that investments in plants producing equipment for reactors and atomic-power transmission might not be an unwise move.

No specific site had been announced for the plant early this week. But it has been stated that it might be located at or near one of the AEC gaseous diffusion plants.

Oppose Social Security Tax Hike

Forecasts are getting more numerous that the Administration next year will urge Congress to cancel the scheduled increase in the social security tax rate.

Rep. Richard M. Simpson, R., Pa., is now on record with a prediction that an official move will be made to hold the tax to its present rate. For employees, the rate is 1 1/2 pct of the first \$3600 of annual income, collected from both the employer and employee. The rate on self-employed persons is 2 pct.

Under existing law, an advance to 2 pct on employees and 3 pct on the self-employed is supposed to take place on Jan. 1. This date occurs before Congress meets, but a rate rollback to Jan. 1 is possible if the lawmakers are persuaded to eliminate the increase.

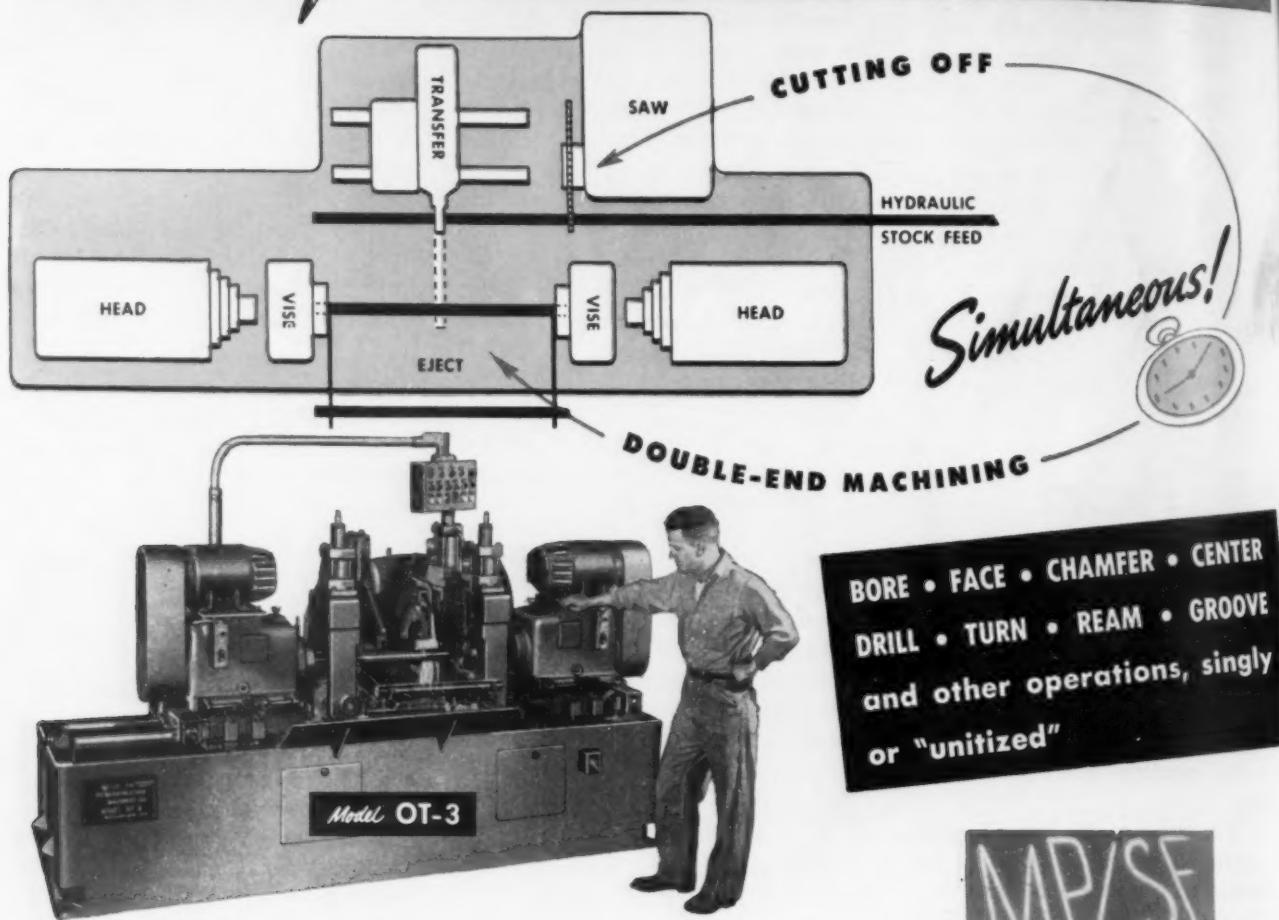
Strong opposition, especially from Democrats in Congress, is expected if the Administration puts on a drive to have the "automatic" rate boost abolished.

Discrimination Clause for D. C.

Possibility of writing "no discrimination" clauses into contracts awarded by the District of Columbia government is being studied by the Administration. If the "fair employment" clause is finally adopted as a standard feature of District of Columbia contracts, its sponsors are then preparing to move for its adoption in all federal contracts. President Eisenhower's Committee on Government Contracts has urged adoption.

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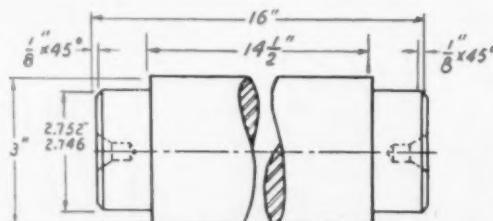
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Production: 110 pieces per hr.



ITEM	Model OT-3	Model OT-4 1/2	Model 2T-6
Rated diameter stock	1/2" to 3"	3/4" to 4 1/2"	1" to 6"
*Standard work length	8" to 40"	8" to 40"	8" to 40"
Weight (approximate)	11,500 lbs.	15,000 lbs.	26,000 lbs.

*Work length can be increased by special arrangement.

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West Coast Report

Titanium Metals Boosts Capacity

New \$500,000 circular kiln roasts 35 tons daily of rutile ore, coke, coal tar . . . Ups processing seven times rate of Basic Magnesium Co. batch kiln—By T. M. Rohan.

Titanium Metals at Henderson, Nev., last week cleared another production bottleneck.

A new \$500,000 circular kiln for roasting 35 tons per day initially of rutile ore, coke and coal tar started production after 6 months construction. Over 50 ft in diameter, it is rotated 1 revolution per 3 hours by a hydraulic ram mechanism. The new kiln steps up processing seven times the rate of the original batch kiln inherited from the wartime Basic Magnesium Co. plant.

Open Book . . . The annual Kaiser report of steel consumption in its area has become a valuable reference on western steel markets. An insight into what lengths researchers must go to get the information was given in a talk last week by B. P. Etcheverry, Kaiser general planning head, whose staff puts it together. Survey forms are mailed to over 2000 regular western carload steel consumers with special emphasis on 350 key customers accounting for 90 pct of tonnage on each product. Only 75 personal follow-up calls to key producers were necessary this year.

Government hearings are also closely watched. Market participation by eastern producers is estimated through rail and water shipment reports. Foreign steel imports are less than 3 pct and government figures are adequate.

Major purpose of the report, the latest issue of which is due in a few weeks, is to plot expansion by products, set district sales quotas and watch share of market obtained. American Iron and Steel Institute figures while broken down by products and consuming

industries are on national basis only.

Mr. Etcheverry pointed out that practically all steel comes from 20 plants. He said he believes Kaiser has second lowest pig iron production in U. S. Third quarter steel sales of \$38 million broke all records while the company has invested almost \$250 million in production facilities. No major recession is expected, "but our financial house is in good order if we have one."

Production Record . . . Still talking of Kaiser, its Fontana mill last week reported an alltime high weekly production output for the week ending Oct. 17 of 32,925 tons or 115.53 pct of rated openhearth capacity. Output was said to be the highest weekly figure ever reported to the American Iron and Steel Institute although occasionally slightly more has been poured in 7-day periods.

Operating men said high output was due to 100 pct furnace avail-



MOLTEN IRON flows from one of Kaiser Steel's three blast furnaces at Fontana, Calif. A third furnace added this spring boosted the mill's total pig iron capacity to 1,314,000 tons annually.

ability and use of 63 pct hot metal to total iron and scrap charge. Current rated capacity is 1,536,000 annual tons.

Seeks More Plants . . . Pressed Steel Car Co. is ready to go shopping for more metalworking plants, John I. Snyder, Jr., president and board chairman, told the Los Angeles Security Analysts last week. Mr. Snyder said the Axelson Mfg. Co. of Los Angeles, only major western machine tool manufacturer, acquired by Pressed Steel last year, will shortly undergo a major expansion of facilities in addition to improvements made since purchase.

In San Francisco, F. C. Russell revealed Pressed Steel is negotiating for lease of a \$500,000 metal window frame and door plant there. He said addition of a West Coast plant to five in Ohio, one each in Boston and Philadelphia and two in Canada is in line with a decentralization program. Operations are expected to be set up by January with first output in Spring.

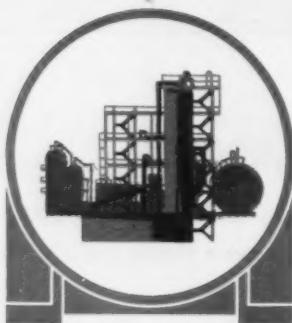
Outranked . . . Corporation vice-presidents were definitely small potatoes around Pebble Beach, Calif., last week as top U. S. corporate brass gathered for a regular meeting of the Business Advisory Council of the Secretary of Commerce.

Among the 100 chief corporation executives were Benjamin F. Fairless, U. S. Steel board chairman; Crawford H. Greenwalt, E. I. du Pont president; Philip D. Reed, General Electric chairman; Thomas J. Watson, International Business Machines board chief; and John D. Biggers, Libby-Owens-Ford Glass president.

Meetings are required by council bylaws to be closed to non-members. Secretary Weeks may, at his discretion, make a public statement at the close of the session, but at press time none had been forthcoming.



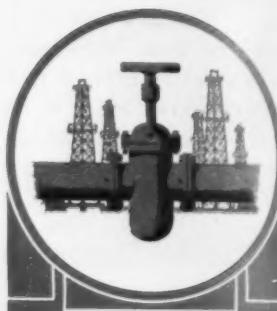
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Machine Tool High Spots

Tool Exports Are A Tough Must

Foreign markets a peacetime necessity for most U. S. tool builders . . . European competition gets rough . . . Sales techniques rusty . . . Study financing—By E. J. Egan, Jr.

Before World War II exports were the difference between staying in the machine tool business and bankruptcy. While the former high percentage of export business may not have to be reached in the next few years, few doubt that the industry can thrive unless it exports a good percentage of its product.

Foreign representatives of U. S. tool builders claim their suppliers have lost much of their export knowledge through lack of practice. Builders in turn are faced with more serious European competition than they ever had.

Please Translate . . . German and English firms, for instance, put Spanish instruction plates on machines shipped to South America, except Brazil. Brazilian units come equipped with instruction plates printed in Portuguese. But most U. S. builders use standard English language plates on machines sold to South America.

The finance problem was discussed recently in New York at a meeting attended by U. S. builders, their foreign sales agents and representatives of the Export-Import Bank. There was little disposition to cut prices by sacrificing quality of U. S. machines. That would lose U. S. builders their reputation abroad. With delivery schedules improving, financing of equipment sold for overseas use seemed to be the No. 1 headache for American producers.

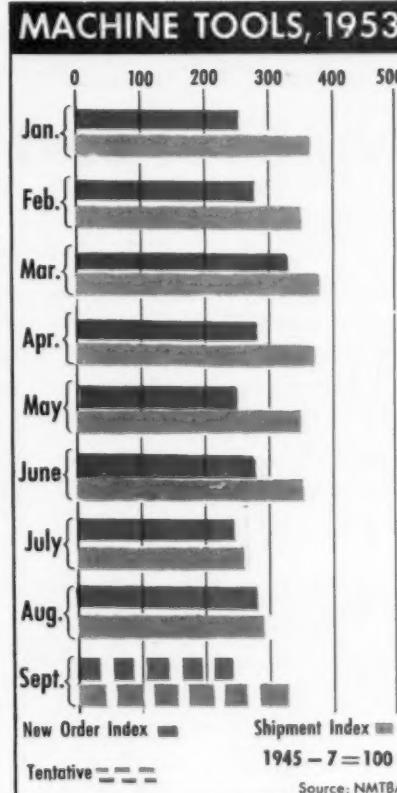
Need Financial Aid? . . . German builders—whose industry (thanks to U. S. money) is in better shape than it was before the war—are far ahead of their American competition on credit terms to cus-

tomers. Selling through a government agency, they can offer terms of 10 pct down, balance in 5 years.

Few, if any, U. S. firms can finance such deals. It was suggested at the meeting that some way be found for Export-Import Bank to underwrite U. S. builders' financing so they can compete.

The Latest Wrinkles . . . Of the hundreds of new and improved products and techniques displayed at the National Metal Congress & Exposition in Cleveland last week, some were of particular interest to machine tool users.

General Electric's Carboloy Dept. chose the occasion of the Congress to announce a new, heavy-duty steel cutting grade of cemented



carbide, claimed to step up machining operations as much as 30 pct. Known as Carboloy Grade 370, the material was specially developed for taking heavy cuts at higher tool temperatures ranging to 1800 F.

Faster & Deeper . . . Carefully controlled processing techniques are used to make Grade 370, which is composed of tungsten carbide, titanium carbide, tantalum carbide and cobalt. Structure obtained is said to be so rigid that, as a cutting tip, the carbide allows one-fourth to one-half more depth of cut at higher speeds.

Extensive field testing of the new carbide by 15 companies included heavy duty machining on locomotive wheels, steel mill rolls, heavy gun breech blocks, shells and turbine rotor shafts.

Unveil Band Saws . . . Also of interest to many of the Metal Show visitors were twin new products of the DoALL Company, Des Plaines, Ill. A new line of band sawing machines was demonstrated, including a new cut-off model. A high speed steel saw band was the second innovation.

The firm's new machines claim many advantages over earlier models. They are said to be capable of a far greater variety of machining operations. With in-built coolant systems, hydraulic table feeds and other control features, they incorporate the flexibility and adaptability of more conventional tools.

"Red Heat" . . . The new high-speed steel saw bands claim a significant advantage over the carbon steel hard-edge type. Retention of "red heat hardness" is all-important to maintenance of tooth sharpness at fast cutting rates under heavy feed pressures. Ability of the new saw band to cut faster and longer will mean greater overall production for the life of the band and less downtime.



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He will gladly make an operational survey of your plant that could turn up new methods of production without increasing overhead. His background of practical foundry experience, a thorough knowledge of pig irons and a natural ability to analyze enable him to make recommendations which often prove both valuable and profitable.

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(Northern)
Foundry, Basic
and Malleable

"PIONEER"
(Southern)
Foundry and Basic



REPORT TO MANAGEMENT . . .

Adjustment to avalanche

Don't expect boom readjustment to avalanche over the economy at one stroke. Softening will be spotty and sporadic at certain manufacturing levels. The less unanimity of decline, the better. Since industry is geared to accept an easing, recession has lost a major weapon--the element of surprise that triggers panicky retrenchment. Consider this report as a gage of confidence: Of 20 distributors polled by American Supply & Machinery Manufacturers' Assn. only one saw business declining in the first half of 1954. Six actually foresaw an increase. Of 59 manufacturers of machinery, supplies, 20 believed first half '54 would equal '53, 21 expected a drop, and 18 saw business volume rising.

Employment loses upsurge

You can trust high employment to support high-plateau prosperity next year--but it will not be an upsurging factor from now on, will probably show further mild dips. In the first half of September, factory employment dropped 60,000 when a rise was usual. Still at peak, non-farm payrolls gained 200,000 workers over August. But to match the rate of previous years, the rise should have been 500,000. For a time the boom has lost its upward drive but the dark cloud is merely a wisp. September payrolls were still a full 500,000 over 1952.

Investment pipeline open

Industry has used boom business to keep greased the pipeline of investment money. Reporting corporations paid over \$6 billion dividends in the first 9 months of '53--a climb of 4.5 pct over 1952. Dropping of excess profits tax, possible shaving of corporate taxes will offset lower sales volume of some industries in '54. But high taxes will plague industry elsewhere.

Layoffs still negligible

Don't be alarmed by panic publicity given current employee layoffs. They're still negligible and can be attributed to declining order backlogs and industry's determination to hold finished inventory at flexible levels. General Electric staggered work schedules of 4000 workers. Motive: Slower refrigerator sales. Timken Roller Bearing Co. extinguished an electric furnace, dropped 95 men because the order rate had sagged.

Deflation bigger risk

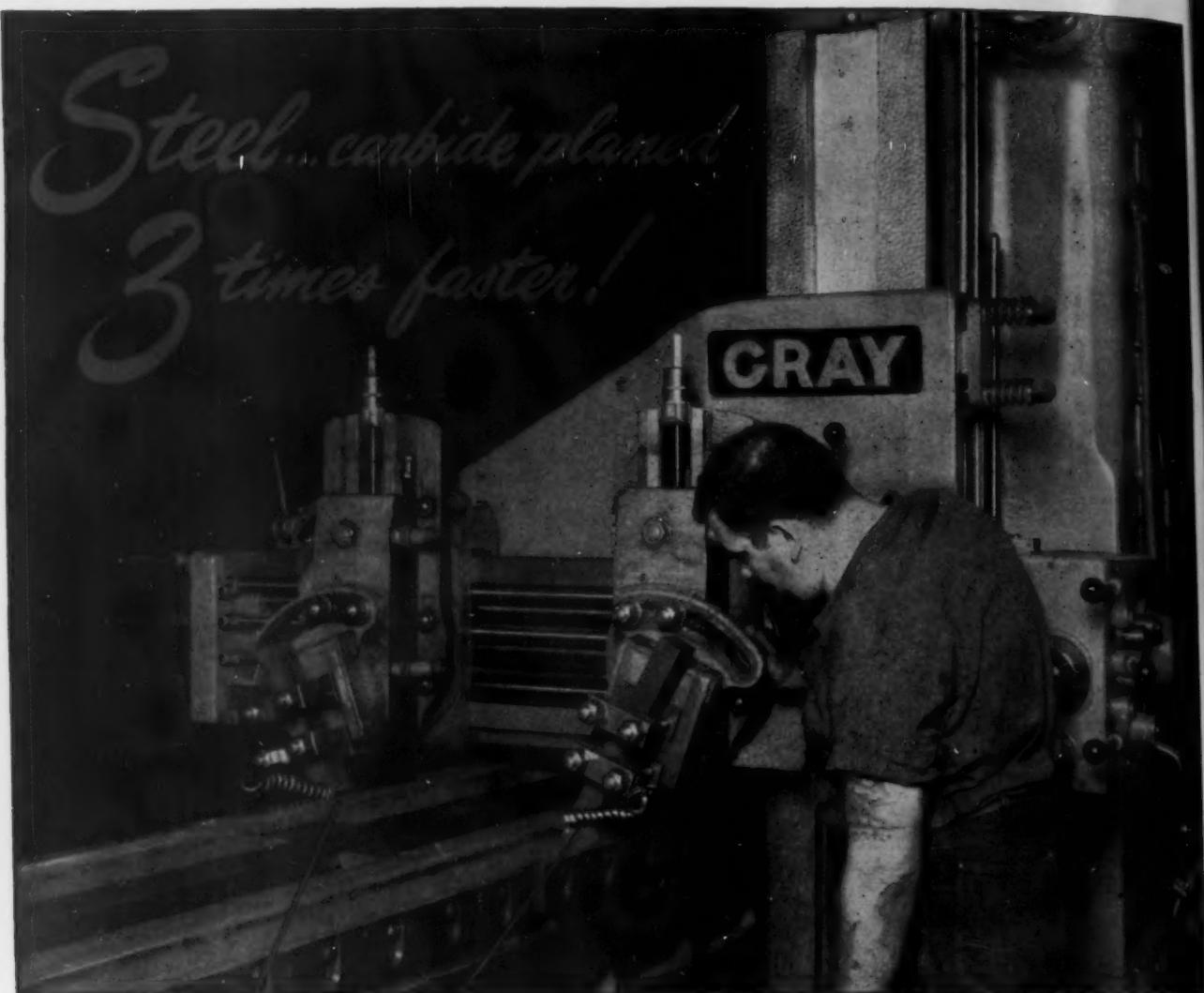
Take a tip from the recent speech of W. Randolph Burgess, Deputy Secretary of the Treasury, that the Administration now regards the "danger of inflation" as "less than the danger of deflation." When business levels recede, deflation dampens latent inflationary fires. Making money more plentiful is one Treasury maneuver to combat deflation. U. S. spending, lower taxes to stimulate purchasing power are others. Built into industry's price-cost structure is an effective though not healthy deflation resistor. Profit margins are too low, costs too high and too fixed to permit drastic price slashing. Though a mild round of price dips may evolve next year no harum-scarum tumble is possible in major portions of manufacturing.

Up side of boom

Production trends show the boom at full power for some industries, waning for others. With August far ahead, TV output for first 8 months '53 was a record 4.7 million. Shipments to dealers were 39 pct above '52 while August spurted 48 pct over July. In the first 9 months of '53, shipments of domestic gas ranges were 5.7 pct over 1952 while shipments of automatic gas water heaters were 20 pct ahead.

Easing back to normal

Meanwhile construction contracts fell sharply in September. Electric power output for that month fell 1.6 pct from August. Rate of unfilled machine tool orders held to the course of gradual decline as defense orders ebbed, civilian orders gained dominance. Railroad installation of new locomotives this year was considerably crimped after 1952's splurge.



another cost saving performance record set
by the **GRAY PLANER CUB**

Former planing time of steel bars and gibs was cut to $\frac{1}{3}$ when this high speed GRAY PLANER CUB was put into action at a leading Midwestern metal fabricating plant.

This is accomplished by the Cub's high speed, greater power and tremendous rigidity—all essential to heavy duty carbide steel planing.

Proof of outstanding performance is the fact that this company has two more Cubs on order. Built in 24" — 30" — 36" sizes. Write for Bulletin 55.

the job: planing hi-carbon, hi-chrome steel bars

cut speed 160' per min. • return speed 300' per min. • two heads • depth of cut 3/32" • feed .040

Dept. C

The G.A. **GRAY** *Company*

planers • milling planers
planer type milling machines
horizontal boring machines

CINCINNATI 7, OHIO, U. S. A.
SOLD IN CANADA BY UPTON, BLADEEN AND JAMES, LTD. • SOLD IN LATIN AMERICA BY MACHINE AFFILIATES



NEVER BEFORE

anything like this on
stripper cranes

- Special electrical counterweight (counter torque device developed by The Alliance Machine Company, prevents ingots from falling, inflicting damage to buggies and also automatically prevents slack cable during stripping operation.)
- Eliminates heavy, hazardous counterweights.
- Due to a unique lubricating device, the ample size bronze nut gives many years of trouble-free service.
- All gears are enclosed and run in oil.
- Cab provides operator with maximum visibility and safety.

There are many reasons why it pays to consult Alliance when you are planning to install material-handling equipment. Over half a century of experience building cranes and mill machinery is always at your disposal.

World's Largest Builders of World's Largest Cranes

TABLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES
STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING
MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION • COKE PUSHERS

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Main Office, ALLIANCE, OHIO • Pittsburgh Office, 1622 OLIVER BLDG., PITTSBURGH, PA.



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HERE IS a single source able to supply all your requirements for screws, bolts and nuts. Pheoll offers the most complete line . . . the most extensive stocks available. Call Pheoll on your next order.

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NUTS • BOLTS • SPECIAL COLD HEADED PRODUCTS



PHEOLL MANUFACTURING CO.
5700 ROOSEVELT ROAD, CHICAGO 50, ILLINOIS

—Free Publications—

Continued

Polishing

Importance of micro-polish and details of its functional arrangement to production line operation are described in a new brochure released by Murray-Way Corp. Engineering specifications, auxiliary equipment and a typical floor plan layout are also included in the text. *Murray-Way Corp.*

For free copy circle No. 13 on postcard, p. 71.

Motors and collectors

Examples of Wesche custom built torque and special motors are provided in a new booklet offered by Wesche Electric Co. Also illustrated in the booklet are a few typical custom built Wesche Collector rings. Specific forms for ordering rings or torque motors are attached. *B. A. Wesche Electric Co.*

For free copy circle No. 14 on postcard, p. 71.

Drilling and tapping

No clutches or lead screws are used in the tapping operation of the Beckett Drilling and Tapping Machine. General information and model illustrations are provided in a booklet available without cost. *Beckett-Harcum Co., Inc.*

For free copy circle No. 15 on postcard, p. 71.

Finishings

Complete finishing systems which are designed, fabricated and installed by Cincinnati Cleaning & Finishing Machinery Co. are illustrated in a new booklet. The following finishing steps are described in detail: Pre-Paint Treatment, Finish Application and Baking or Drying. *Cincinnati Cleaning & Finishing Machinery Co.*

For free copy circle No. 16 on postcard, p. 71.

Conveyors

Complete line of Webb floor type conveyors is illustrated in a new products catalogue. Dimensions and purposes of each type of conveyor are given. *Jervis B. Webb Co.*

For free copy circle No. 17 on postcard, p. 71.



...with TYCOL lubricants on hand!

The "All-Weather" Bearing Lubricant! Steel mills have shown a lively interest in Tycol Acylkup 4, a year 'round bearing grease that does a variety of jobs with a complete disregard for thermometer readings. Although all methods of application are suitable, one "3-Furnace" mill has found it particularly adaptable for use in its automatic grease systems — with complete ease of pumping even in the coldest weather. From Blast furnaces:

Sheave Bearings, Bell Mechanism, Skip Hoists, etc. . . . to Coal and Ore Bridges, Tycol Acylkup 4 is a natural for lubricating yard equipment in every steel mill. With two big savings: "all weather" protection . . . and lowered maintenance costs on automatic pressure systems. For details, contact your local Tide Water Associated office!

Over 300 Tycol industrial lubricants are at your disposal . . . engineered to fit the job!

REFINERS AND MARKETERS OF VEEDOL . . . THE WORLD'S MOST FAMOUS MOTOR OIL

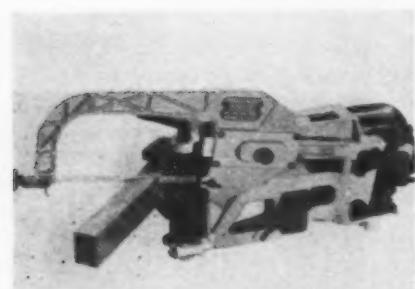
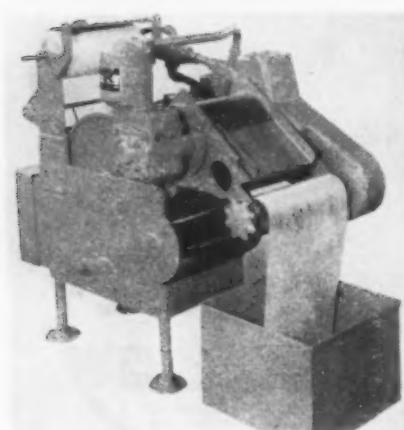
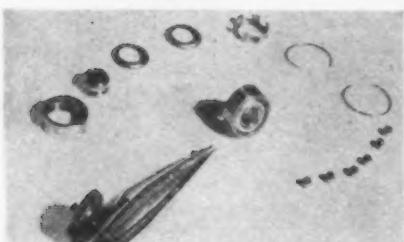
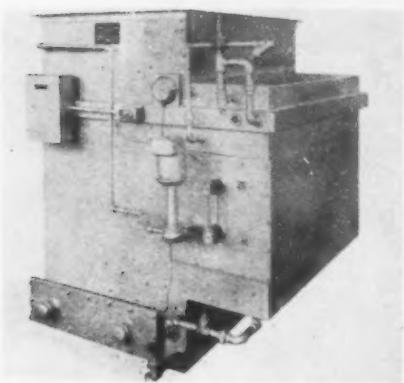


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NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 73 or 74.



Vapor degreaser has improved design

Features of a new Metalwash vapor degreaser include obstruction free tank walls, recessed condensing coils, removable pump chamber and water separator manufactured of solid stainless steel, one end maintenance and demand type control of water into the water condensing system. The condensing coil has been recessed into a back compartment and a large sloped

condensate tray is directly under the new coil. The over-size water separator and pump compartment are welded to a flanged plate to permit removal of the complete unit for periodic inspection of the storage tank interior. Design permits conversion of a straight vapor degreaser to a vapor spray degreaser. *Metalwash Machinery Corp.*

For more data circle No. 18 on postcard, p. 73.

Protection for tiny ball bearings

Dirt, lint and contaminated atmospheres will no longer be a limiting factor in the application of miniature ball bearings. A new series of single and double-shielded miniature fractional inch size precision ball bearings of full race and

retainer type construction are available. These bearings, down to 0.1562 (5/32 in.) OD are produced in 9 sizes. Shields are removable for bearing re-lubrication. *Minature Precision Bearings, Inc.*

For more data circle No. 19 on postcard, p. 73.

Filter removes contaminant load magnetically

New fabric and magnetic filter combines the practical and economical use of permanent magnets to remove all the magnetically attracted material, and the precision cleaning obtained by positive filtration through a selected fabric. Contaminated coolant from the work station on metalworking machines flows directly into the flow channel around the magnetic drum. The magnetic material is attracted

to and held onto the drum until it is scraped off at the discharge position. After exposure to the magnetic field, the coolant passes to the filtering area where it passes through a positive filtering fabric of specific porosity which removes all non-magnetic contaminants to the required clarity before recirculation to the work. *Barnes Drill Co.*

For more data circle No. 20 on postcard, p. 73.

Hack saw makes angular cuts in any position

Besides having an ordinary hack saw's advantages, this portable power hack saw is claimed to cut accurately and consistently, saves time and labor. Called the Hand-I-Hack, the 50-lb saw cuts in any position, metal, plastic or fiber stock of 3 in. or less diameter at

any angle from 45° to 90°. The saw blade draw cuts and then lifts on its return stroke, eliminates the necessity for weights; can be operated vertically, horizontally, even upside down. *Lipe-Rollway Corp.*

For more data circle No. 21 on postcard, p. 73.

Turn Page

ANACONDA[®] METALS AT WORK

Copper "package" for the coldest products on earth

This container for storing and transporting liquefied helium (-452 F.) or hydrogen (-421 F.) is made by Superior Air Products Co. of Newark, N. J. The secret of keeping heat out to reduce evaporation is four concentric copper spheres separated by a high-vacuum space, a nitrogen protecting bath, and a second high-

vacuum space — the entire unit enclosed in a stainless steel casing. Copper contributes ductility and malleability for spinning into hemispheres, unexcelled soldering properties for joining into spheres, and a mirror finish to reduce radiation losses. Need we tell you that it's made of ANACONDA Copper?



This "iron horse" runs on brass

The "High Iron" we're referring to is the HOBBYLINE HO-GAGE model railroad track which John A. English & Co. of Morrisville, Pa., makes of FORMBRITE** strip. This fine-grain, yet ductile forming brass

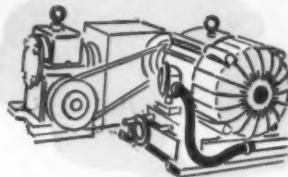
produces a track so strong and stiff it will support an adult's weight. In products where finishing costs count, users find that FORMBRITE usually needs only a color buff to produce a high finish.



Flexible conduit enjoys a splash in a bath

The real trick is to make an electrical conduit that's flexible and liquid-tight and approved by Underwriters' Laboratories for such applications. SEALTITE* Type UA does all three. Made with a tough syn-

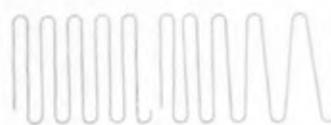
thetic jacket extruded over a flexible steel core, it's shown here protecting wiring to motor in an auto laundry. It ignores not only splashing, but also oil and grease, and resists abrasion. Want more facts?



We put an end to "the bends"

We don't mean the kind deep-sea divers suffer from, but the kind heating contractors had to put up with when they installed radiant panel heating systems. Heretofore, many contractors formed the panel grids on the job by hand-bending them from coils of tubing—a time-consum-

ing, laborious, back-breaking job. Now PG's** have ended all that. They are the new, compactly packaged, accurately pre-formed ANACONDA Copper Tube Panel Grids . . . from the handy carton to installation is only a matter of minutes. PC's are another ANACONDA first.



A service for you

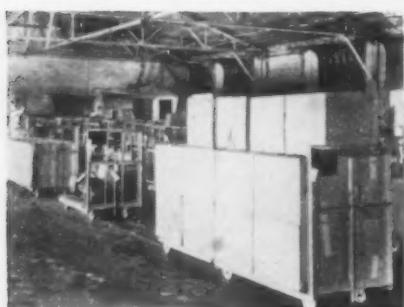
Our Technical Department has a range of experience that covers the entire field of copper and copper-alloy applications in industry. If you have a problem of metal selection, we are at your service. *The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.*

*Trademark
**Reg. U.S. Pat. Off. 5298

ANACONDA[®] the name to remember in COPPER — BRASS — BRONZE

New Equipment

Continued

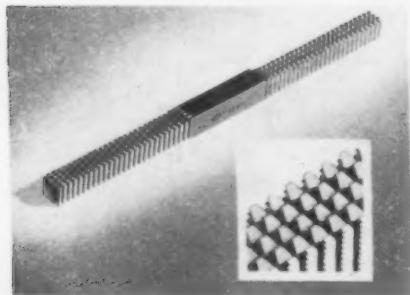


Dragline trucks simplify load-handling problems

Floor dragline systems are gaining ever-increasing acceptance among motor freight terminals and warehousing operations of all kinds. A truck-trailer arrangement can solve the problem of handling various sized loads, and at peak periods extra-long loads or light bulky ones. Truck in the foreground

illustrates two-wheel trailer attachment to standard 4-wheel dragline truck. The trailer is quickly and easily detachable. An extremely flexible system, one or two trailers may be attached to one truck when extra length is necessary. *Lewis-Shepard.*

For more data circle No. 22 on postcard, p. 73.

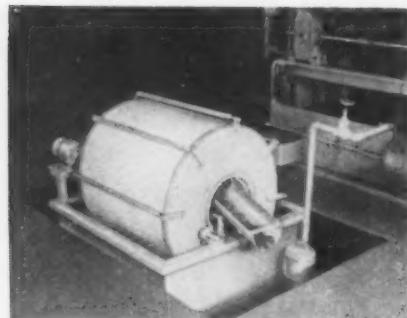


Deformed external threads quickly restored

External threads which have been damaged or deformed can be quickly returned to original condition without reducing the root and outside diameters, by a thread restoring tool Nu-Trix. The tool eliminates shaping with a three-cornered file or the use of a die. Used like a file, a few quick passes across the

damaged threads with Nu-Trix remove burrs and deformed metal and reshape threads to original conditions. The tool is made of hardened steel, is available for National Coarse or National Fine threads. There are 8 thread sizes on each tool. *Reiff & Nestor Co.*

For more data circle No. 23 on postcard, p. 73.

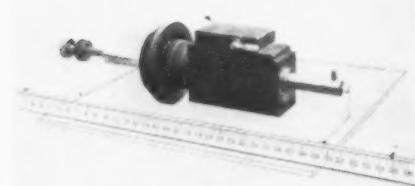


Automatic filter is efficient and economical

New automatic filter for all types of industrial filtration automatically rotates fresh filtering area into position while simultaneously ejecting contaminant cake. Filtering screen material and size of screen opening can be supplied in Monel, stainless steel, brass or bronze to fit all requirements. This compact

unit offers unusual filtering capacity in proportion to floor area occupied; may be used on an individual machine unit, or as a central filter for many units. Gallon capacity of filtration may be increased by adding filter drums in tandem. *Murray-Way Corp.*

For more data circle No. 24 on postcard, p. 73.



Precision boring machine mounts jigs or fixtures

New precision boring machine designed for close tolerance boring is compact enough for mounting on workholding fixtures or assembly jigs. It measures overall 29 1/2 in. long, 6 3/4 in. high, x 5 1/4 in. wide. The spindle feeds into the work

featuring a principle of positive feed through oil displacement. Tolerances of ± 0.0003 in. and finishes to 20 micro-inches or better are achieved. Bore diameter ranges from $\frac{3}{8}$ to $6\frac{1}{2}$ in. *Hydro-Borer Co.*

For more data circle No. 25 on postcard, p. 73.



Fluorimeter eliminates need for cooling system

Advanced design of a new G-M fluorimeter eliminates the need for air or water cooling systems and optical meters. The instrument, which is made for use in laboratory or plant, consists of three basic units: an ultraviolet light chamber and sample slide, a detecting and measuring unit, and a power supply. The ultraviolet light chamber consists of an aluminum block which holds the ultraviolet lamps and contains an opening for

the sample slide. The sample slide, which contains compartments for the sample melt and a fluorescent standard, automatically centers itself in reading position and activates the correct shunt so that the standard reading can be checked before and after each sample reading. All units except the power supply are mounted in a gray metal base forming a compact and portable instrument. *Jarrell-Ash Co.*

For more data circle No. 26 on postcard, p. 73.

The Iron Age

SALUTES

Roy A. Hunt

For over 50 years he has carried on a family tradition of devoted service to the aluminum industry.



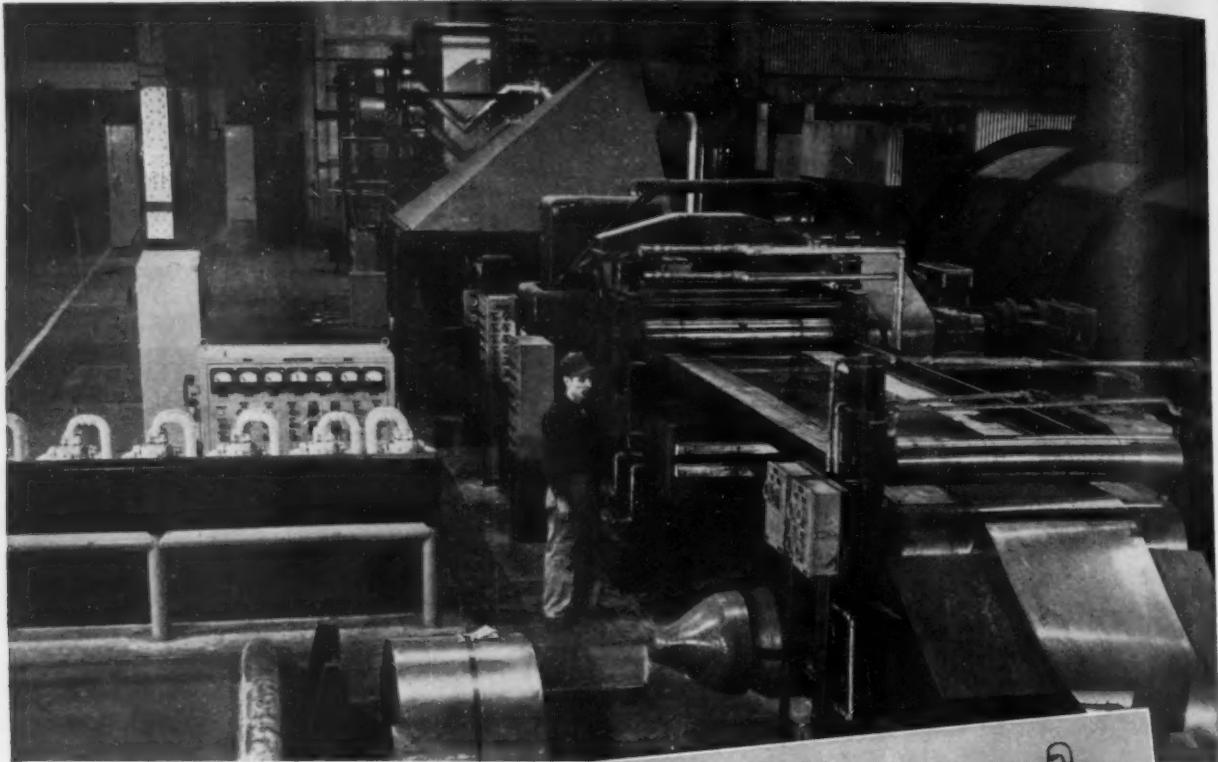
OPEN House visitors to the new Alcoa Building in Pittsburgh chuckled as they filed past the abstract painting, "A Day at the Races" in the main lounge on the penthouse floor. What caught their eye was a neatly-penned card beside the painting reading, "Not painted by my grandson nor me, but renamed 'Dripping Wet,' by Roy A. Hunt."

The chuckles grew louder when the true identity of the note writer was realized. It was the work of Roy A. Hunt, chairman of Alcoa's Executive Committee and son of Captain Alfred E. Hunt, founder of Pittsburgh Reduction Co., now Alcoa. What prompted Mr. Hunt to write the note is a long story indicative of two things: (1) He doesn't care for abstracts, and (2) he has a keen sense of humor.

The 72-year-old former president of Alcoa recently received a diamond-studded lapel button from the company signifying 50 years of continuous service. He was the tenth person in Alcoa's 65-year history to receive the award.

During his long career with Alcoa, Roy Hunt has worked at a lot of jobs, including machinist helper and mill clerk at the New Kensington, Pa., plant. He was elected president in 1928 and held that post until 1951 when he became chairman of the Executive Committee. He participates actively in numerous educational and welfare groups.

In 1943, Mr. Hunt was awarded the American Society for Metals medal for Advancement of Research. In 1948, he was presented a certificate of appreciation for wartime services by Kenneth C. Royall, then Secretary of the Army.



Continuous sheet galvanizing.

**Over 350,000 tons of Zn
annually for "embalming"**



ONE OF the most persistent problems confronting the iron and steel industry is the prevention of corrosion; its persistence stems from the fact that we cannot rid ourselves of the agents which effect the corrosion without, at the same time, ridding ourselves of elements — air and water — which are essential to life itself.

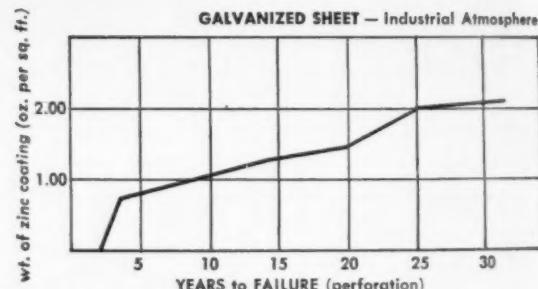
Iron does not occur naturally in the metallic state, but only in combination with oxygen and other elements in the form of ore. The smelting of iron is essentially a process for removing the oxygen from the ore by the application of heat; while rusting is, in essence, the reversion of the metal to its natural state by recombination with the oxygen in the air. The rusting process, being electrochemical in character, is actually far more complicated since the moisture and impurities present in the air play a very important part. There is thus a close relationship between the processes connected with the preservation of organic tissue and the prevention of rust. However, while human beings stave off the decaying or "rusting" of their tissues by nutrition, no means have been developed for "feeding" or regenerating iron and, until such time, industry has adapted the ancient Egyptian practice of "embalming."

The most widely used method of "embalming" iron and steel products to prevent their decomposition is by galvanizing, i.e., zinc coating. The fact that, for many years, nearly 50% of all the zinc consumed annually in the United States is used for this purpose, is ample evidence of the firmly established position of the metal as industry's most effective "sacrificial" weapon in its unceasing combat with the ravages of rust.

ST. JOSEPH LEAD COMPANY
250 PARK AVENUE, NEW YORK 17, N.Y.

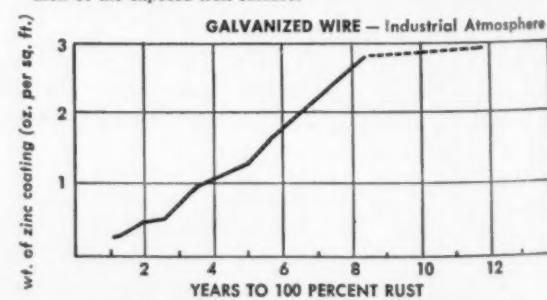
ST. JOE *electrothermic* **ZINC**

HIGH GRADE • INTERMEDIATE • PRIME WESTERN



• "The most important factor in determining the lives of zinc coatings in industrial atmospheres is the weight of zinc applied." from U.S. Bureau of Standards, Circular #80

• The remarkable protective effect of zinc on iron is due to the fact that for electrochemical reasons corroding agents will attack zinc in preference to iron if the two are in contact. Rusting of iron does not occur even at scratches or cut edges of a galvanized coating so long as any zinc remains within about one quarter inch of the exposed iron surface.



The Iron Age

INTRODUCES

T. O. Armstrong, appointed assistant to the president, DUMAS STEEL CORP., Pittsburgh; **Karl Adler**, appointed general manager of sales; and **Rodney R. Burns**, appointed sales manager, Pittsburgh district.

R. G. Willaman, elected executive vice-president, PETERSON STEELS, INC., Union, N. J.; **D. B. Hassinger**, elected vice-president; and **F. W. Bussell**, appointed secretary and treasurer.

G. Clymer Brooke, elected executive vice-president, BIRDSBORO STEEL FOUNDRY & MACHINE CO., Birdsboro, Pa.

C. C. Bartell, appointed vice-president in charge of sales of axles and related equipment, Timken-Detroit Axle Div., ROCKWELL SPRING AND AXLE CO.

Robert J. Campbell, appointed vice-president in charge of sales, VOLCO BRASS & COPPER CO., INC., Kenilworth, N. J.

Thaddeus Augustyn, appointed vice-president, AMERICAN RESEARCH CORP., Bristol, Conn.

Donald S. Waters, appointed financial assistant to the vice-president and general manager, KAISER METAL PRODUCTS INC., Bristol, Pa.

William O. Robertson, elected a vice-president, ARMCO STEEL CORP., Middletown, Ohio.

W. W. Knight, Jr., named vice-president, Barrett Div., ALLIED CHEMICAL & DYE CORP., New York.

James D. Weber, appointed sales application engineer, Detroit district sales office, RELIANCE ELECTRIC & ENGINEERING CO.

Arthur F. Younghans, appointed abrasive engineer for Colorado, Iowa and Nebraska, BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

John I. Swanson, becomes sales-engineer, Wire Product Div., UNION STEEL PRODUCTS CO., Albion, Mich.

Bert Grant, named sales-engineering representative, Pittsburgh office, TUBE TURNS, INC., Louisville, Ky., and **Clyde Chronister**, named sales-engineering representative, Tulsa.

John S. Hart, appointed field electrochemist, HANSON-VAN WINCKLE-MUNNING CO., Matawan, N. J.

Dr. John A. Ferguson, has joined the ceramics and minerals staff, ARMOUR RESEARCH FOUNDATION of Illinois Institute of Technology, Chicago.

Joseph J. Moore, appointed manager, stainless steel sales, VIKING STEEL CO., Cleveland.

W. J. Joyce, Jr., appointed manager, Market Research, Timken - Detroit Axle Div., ROCKWELL SPRING & AXLE CO., Detroit.

Frank A. Peschl, appointed director of engineering, OLIN INDUSTRIES, INC., East Alton, Ill.

Dr. Blaine O. Schoepfle, assigned to the Plastics and Resins Group, HOOKER ELECTROCHEMICAL, **Leopold A. Robillard**, assigned to the pilot plant development group; and **Dr. Samuel Gelfand**, assigned to Fluorine Chemicals Group.

Dr. O. G. Haywood, Jr., appointed manager of Engineering Planning, SYLVANIA ELECTRIC PRODUCTS INC., New York.



JOHN W. JORDON, appointed assistant to executive vice-president Accounting, U. S. Steel Corp., Pittsburgh.



ROBERT C. TREES, appointed director of advertising, sales promotion and market research, Udylite Corp.



LEWIS D. FYKE, appointed vice-president in charge of sales, The Cleveland Hardware & Forging Co., Cleveland.

Personnel

R. W. Sykes, appointed manager, new Contract Sales Div., INLAND STEEL PRODUCTS CO., Milwaukee.

Joseph A. Anderson, appointed general manager, AC Spark Plug Div., GENERAL MOTORS CORP., Flint, Mich.

Frank B. Nuelle, named manager, Engineering Administration Section, Carboloy Dept., GENERAL ELECTRIC CO., Detroit.

J. Donald Akers, appointed district manager, Detroit sales office, BULLDOG ELECTRIC PRODUCTS CO.

George A. Hinckley, appointed sales manager, AUTOMATIC TRANSPORTATION CO., Chicago.

Elmer J. Lell, appointed sales manager, WALL COLMONOY CORP., Detroit.

A. V. McMurray, promoted to sales manager, MASTER TANK & WELDING, Dallas.

Leroy J. Wieschaus, appointed district manager, Birmingham sales office, AMERICAN WHEELABRATOR & EQUIPMENT CORP., Mishawaka, Ind.

V. E. Doonan, appointed field manager, Western Div., KAISER-WILLYS sales Div., Toledo.

William H. Murphy, appointed district manager, Metal Industries Dept., THE DIVERSEY CORP., Chicago.

U. R. Gress, appointed assistant sales manager, trailer axles, Timken-Detroit Axle Div., ROCKWELL SPRING & AXLE CO., Kenton, Ohio, plant.

Leland L. Mantel, named sales representative Denver district office, ALLIS-CHALMERS MFG. CO.; and Louis E. Liphardt, becomes sales representative, Phoenix district office.

Thurman G. Thurston, appointed Cleveland representative, SELAS CORP., Philadelphia.



WARREN L. PIERSON, elected a member of the board of directors, Fruehauf Trailer Co.



FRANK LONG, becomes sales engineer, Cleveland office, E. W. Bliss Co., Canton, Ohio.

SELECT A *Sterling* THAT FITS YOUR JOB!

TUBULAR STEEL FRAME

12 SPOKE STEEL WHEEL

PNEUMATIC TIRED WHEEL

IMMEDIATE SHIPMENT

WOOD HANDLE BARROW

There's a Sterling Barrow for every type of hauling job, whether it's dry, bulky materials like sawdust or heavy industrial loads like castings or steel parts. Also special barrows for brick, tile, coal, concrete block and similar materials. All barrows are scientifically designed, well balanced and sturdily constructed for a long service life. Choice of wood handles or tubular steel frame, steel wheels or pneumatics. Write for new Sterling Wheelbarrow Catalog No. 61.

DEALERS: Want to sell quality wheelbarrows? You can on our non-exclusive basis. Write for details.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Sterling WHEELBARROWS

Look for this Mark of STERLING Quality



DR. OTTO KARDOS, appointed chief research electrochemist, Hanson-Van Winkle-Munning Co.



CHARLES W. SNYDER, named district sales manager, DeWalt Inc., subsidiary of American Machine & Foundry Co.

Remember it's

Jalten*

for

• HIGH STRENGTH

• GOOD FORMABILITY

• RESISTANCE TO CORROSION

• RESISTANCE TO ABRASION



J&L's new JALTEN series replaces the famous Otiscoloy line and may be selected in the following combinations of advantages:

Jalten No. 1—High strength, good formability and fabricating, good low temperature impact resistance.

Jalten No. 2—High strength, moderate forming—improved resistance to atmospheric corrosion.

Jalten No. 3—High strength, moderate forming — improved resistance to abrasion.

You'll find the data you want in this book . . . send for your copy TODAY! Features of this book show how JALTEN can help you build better products:

• Chemical Properties of Jalten

• Mechanical Properties of Jalten

• Jalten Equivalents

• Jalten Application Data

**J&L
STEEL**

Jones & Laughlin Steel Corporation
403 Liberty Avenue, Gateway Center, Pittsburgh 30, Pa.

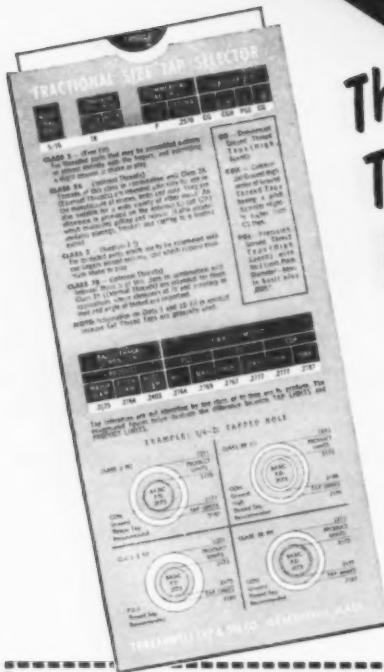
Please send me a copy of "Jalten . . . the low alloy high strength steel."

Name _____

Company _____

Address _____

**JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH**



Threadwell's New TAP SELECTOR Brings Results, too!

Based on the latest Unified and American Screw Thread data, this spectacular Tap Selector makes it easy for every user of taps to select the proper tap for the job . . . and boost production, tool! It's the most complete Selector ever offered, and it's FREE for the asking. Your Threadwell Distributor has it. Mail the coupon and we'll see he gets yours to you.



**THREADWELL TAP & DIE CO.
GREENFIELD, MASS. U.S.A.**

I'd like copies of the new Tap Selector.

NAME _____ POS. _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

Personnel

Continued

Clarence L. Holmberg, has been appointed general manager of sales, INLAND STEEL CO., Chicago.

Herman M. Rittger, has been named general manager, Tool Steel Sales, SOLAR STEEL CORP.

Stanley W. Cramer, appointed acting manager, Special Apparatus Div., RADIO CONDENSER CO. He succeeds Frank A. Cowgill, who resigned because of ill health.

Richard T. Burke, sales engineer, added to the Houston staff, TUBE TURNS, INC., Louisville, Kentucky.

S. Sydney Minault, has been appointed chief engineer, NATIONAL RESEARCH CORP., Cambridge, Mass.

A. G. Trivison, appointed manager, Industrial Oven Div., W. W. SLY MFG. CO., Cleveland.

Gordon E. Brooks, named Atlanta sales representative, ATLANTIC STEEL CO., Atlanta, Ga.

Robert T. Greiner, has been appointed district sales representative, Manufacturing Div., ALUMINUM INDUSTRIES, INC., Cincinnati.

OBITUARIES

Frank Mossberg, 94, president, Mossberg Pressed Steel Corp., an inventor of many devices used in heavy machinery manufacturing, patented first practical roller bearing in 1892, held more than 200 patents, recently in Attleboro, Mass.

Walter Giger, 57, long active in electric, diesel and gas turbine locomotive development work and an application engineer in the electrical section, Allis-Chalmers Mfg. Co., Norwood Works, recently in Switzerland.

George W. O'Keeffe, 53, assistant sales manager, Boston Works, Allis-Chalmers Mfg. Co., Milwaukee.

Airless blasting—

ABRASIVE SHOT Cuts Sheet, Strip Cleaning Costs



By **Gilbert D. Dill**

Engineer in Charge of Steel Div.
American Wheelabrator & Equipment Corp.
Mishawaka, Ind.

- ◆ Blasting of hot-rolled steel strip and sheet with abrasive steel shot has cut cleaning costs sharply in many processing plants . . . Shot is hurled at high velocity from bladed wheels rotating at 2250 rpm.
- ◆ Units may be used alone or added to existing pickling lines . . . Sheets are cleaned for as little as \$2.80 per ton and strip at \$1 to \$2 per ton . . . Practically no metal is lost in cleaning . . . Abrasive shot is recovered . . . In some cases, floor space requirements are 50 pct less.

◆ MECHANICAL BLAST CLEANING is one way many processors of steel strip and sheet are cutting costs in spite of rising prices. By using a mechanical shot blasting unit for cleaning, they can (1) eliminate pickling and oiling of hot-rolled steel, (2) descale at much lower cost than by pickling, (3) eliminate objections to pickling such as the hazard of stream pollution, (4) cold roll or cold draw metal more easily, and (5) conserve steel by removing little and recovering that which is removed. Abrasive used for descaling is also recovered.

Mechanical descaling is done in special cabinets of various sizes, using the airless blasting principle. Steel shot abrasive is hurled at high velocity upon the work by centrifugal force from the blasting units. These are bladed

wheels which rotate at 2250 rpm and throw abrasive under directional control without the use of compressed air.

A typical machine may be installed as a 100-pct mechanical cleaning line or as an addition to an operating pickling line. The latter case eliminates about 50 pct of the acid pickling work and affords a 50 pct increase in the production of the line, or any variation of this ratio that may be desired.

Cleaning costs per ton of material processed in plants using the method have been lower than the costs of pickling. Where required, mechanical cleaning makes it possible to clean material on the basis of current needs, since it can be operated either intermittently or continuously without injuring the material. In

contrast to pickling, there is no operational expense when production is shut down.

Mechanical descaling has saved thousands of dollars monthly in cleaning costs for several large firms. Sheets, for example, as thin as 16 and 18 gage, can be cleaned mechanically for as low as \$2.80 per ton. Pickling of these sheets is generally above \$4 per ton. Several companies are now cleaning strip mechanically at a cost of between \$1 and \$2 per ton as against \$2 to \$3 per ton for pickling.

One manufacturer of lithographed drums cleans 16 and 18-gage hot-rolled sheet by this process in each of seven plants at the rate of 17 tons per hour. The total cost is \$2.83 per ton, including overhead and depreciation as well as the operational cost of other equipment in the cleaning line. The entire mechanical cleaning line consists of a feeder, mechanical blast cleaning unit made by the American Wheelabrator & Equipment Co., Mishawaka, Ind., roller leveler, hot-water scrubber, roller coater, hot-air drier and stacker. Sheet sizes range up to a 72-in. length by a 37-in. width. Lineal speeds up to 150 fpm are attained.

The process leaves a fine scale-free and dirt-free finish. This surface anchors the lithographed design in a permanent bond so that it does not crack even during subsequent forming of the drums. The abrasive, with a nominal particle diameter of 0.011 in. is thrown by eight wheels in each machine. Between \$3 to \$4 per ton were saved in steel costs by installing this process rather than purchasing pickled and oiled sheets.

Another company cleans 14-gage to $\frac{1}{4}$ -in. thick sheets prior to blanking, piercing, form-

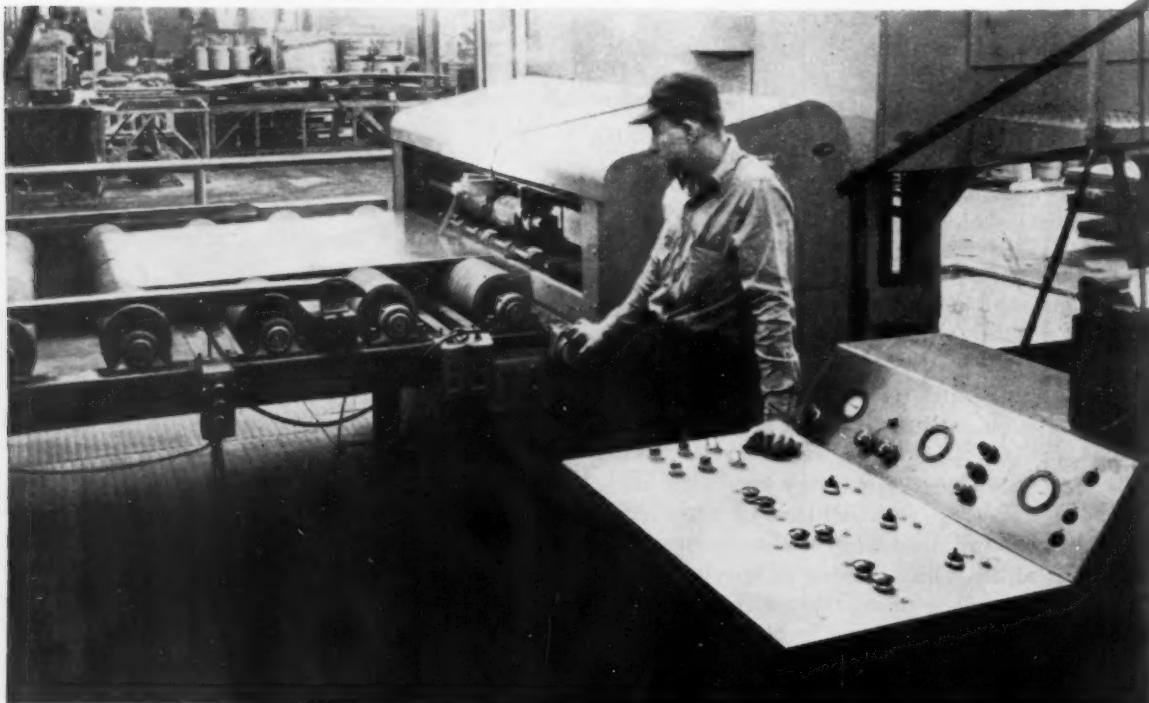
ing, and welding. The sheets ranging from 36 to 60 in. wide and 42 to 72 in. long are cleaned at the rate of 50 fpm. Centrifugal blasting costs \$1.80 per ton without overhead and amortization which compares with a previous cost of \$7.50 per ton for pickled and oiled sheets.

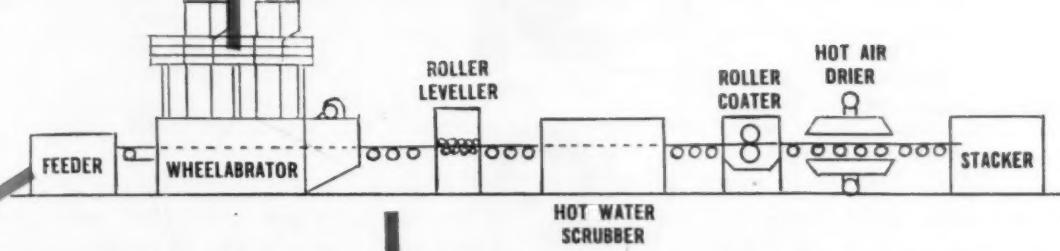
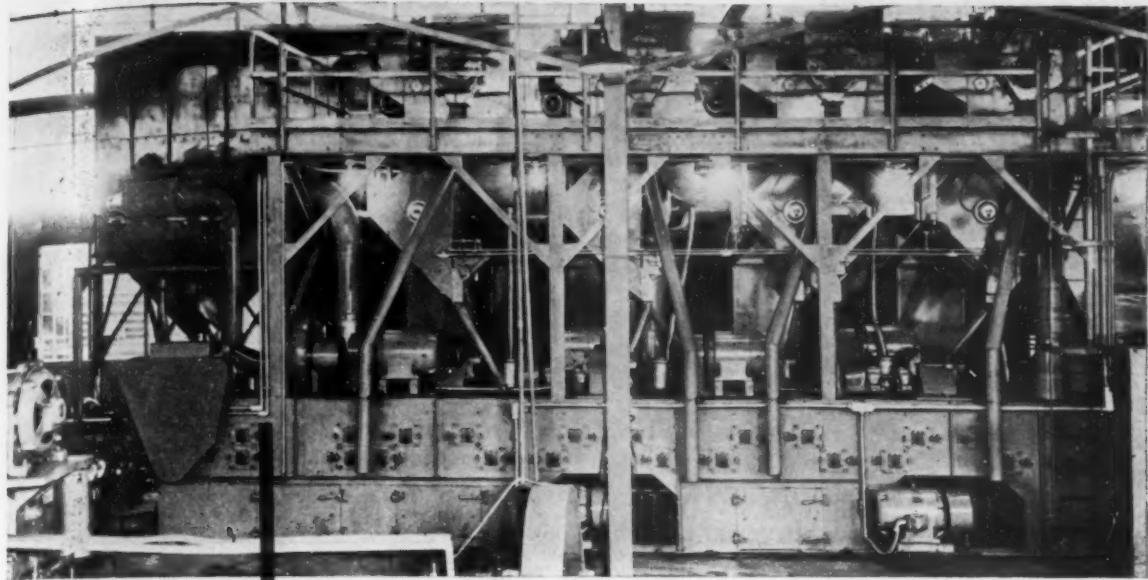
Comparable economies can be achieved with strip. A major steel firm producing hot-rolled stainless strip reduced costs substantially with mechanical descaling by elimination of scale breaking on straight chrome grades. The descaling line, incorporating a Wheelabrator cleaner with four abrasive throwing wheels, requires only five men. This compares with 24 men for batch pickling which it replaced. Floor space requirements were decreased nearly 50 pct.

Practically no virgin metal is lost during cleaning. Weight loss varies according to the grade of steel cleaned, but the average is well under 1 pct and is due wholly to scale. This contrasts with 1½ pct usually experienced with pickling.

In this installation, cleaning speeds for the 9 to 37½ in. wide stainless strip vary from 35 to 75 fpm. The operation has shown a cleaning cost which is 65 pct of the cost of straight pickling of low-carbon steel without benefit of mechanical cleaning. The same company also operates a similar line for high-silicon steel strip with costs running only 85 pct of those for pickling low-carbon steel.

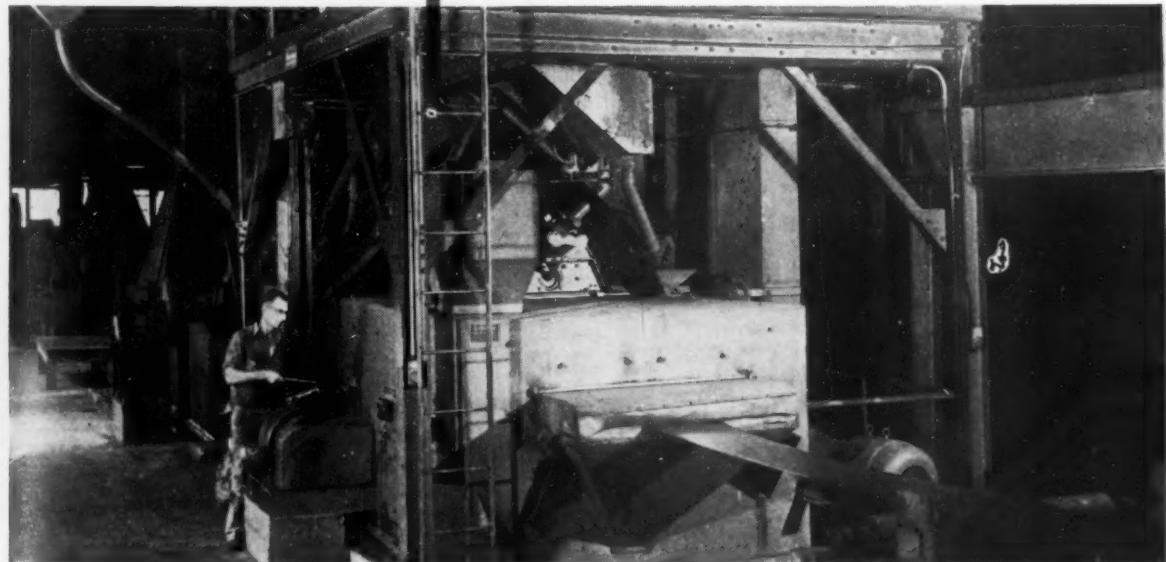
A more recent installation for mechanical cleaning of stainless strip is used in conjunction with annealing and acid passivation. A reduction of 50 pct in cleaning costs is reported over that for straight annealing and pickling.





SHEETS START TO FLOW into the shot blast cleaning line (on facing page) by the mere touch of a button. Abrasive steel shot hurled at high velocity from bladed wheels in cleaning unit

(above) descale hot-rolled sheets at the rate of 17 tons per hour. The cleaning unit can be used separately or in a continuous line with an annealer (below) or other equipment.



With equivalent alloys—

How Do Boron Steels Compare in Machinability?



By Norman Zlatin



J. F. Kahles



W. H. Friedlander
Metcut Research Associates
Cincinnati

- ◆ Although considerable research has been done on boron steels, little is known of their machining characteristics . . . To obtain more information, Watertown Arsenal undertook a research program on the subject.
- ◆ Six standard alloys steels and seven equivalent boron steels were compared . . . Tests showed the boron steels to have better machinability than equivalent standard steels.

◆ SHORTAGES of critical alloying elements brought about by heavy demands of the defense program have resulted in considerable research on the properties of boron steels. Adding small amounts of boron to steel produces an appreciable increase in hardenability. Where hardenability is the sole requirement, boron can replace conventional alloys with a subsequent saving in these

critical materials. Big factor is machinability.

Although boron steels have received much attention little is known about their machining characteristics because of the comparatively small tonnages in use. To obtain more information on this subject the Watertown Arsenal conducted a research program on the relative machining characteristics of boron steels. In this

TOOL LIFE v. CUTTING SPEED

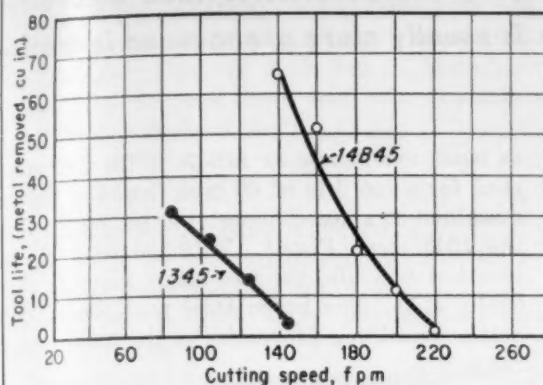


FIG. 1—Difference in machinability between 1345 and the easier to machine 14B45 steels is due to 1345's high manganese content.

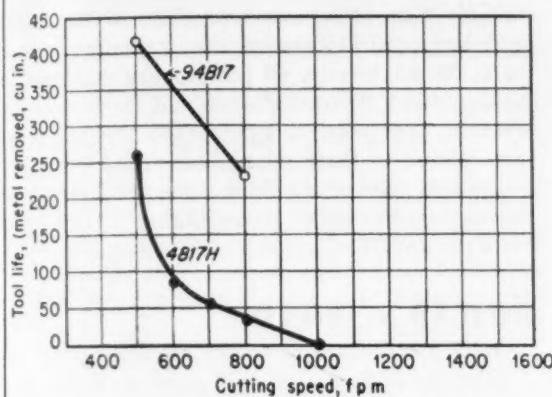


FIG. 2—Higher cutting speeds can be used in machining 94B17 than are used with 4817H. Microstructure of 94B17 favors machinability.

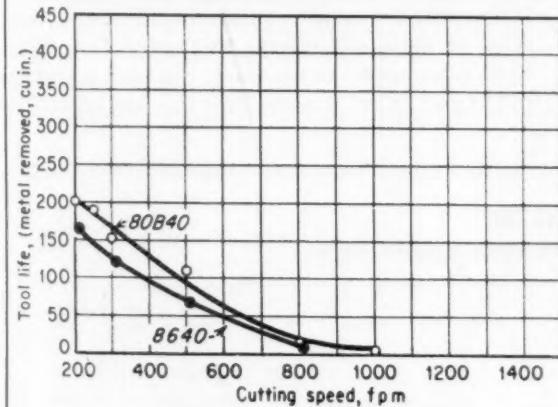


FIG. 3—Tool life curves of 80B40, compared with 8640, indicate machining characteristics for the boron grade are slightly better.

project, the machining properties of six standard alloy steels and seven equivalent boron steels were compared. Both surface finish and tool life in terms of metal removal were used to determine machinability. However, tool life studies provide a sounder basis of comparison.

Types of steel studied, their microstructures and hardness are given in Table I. All steels used were openhearth or of openhearth quality.

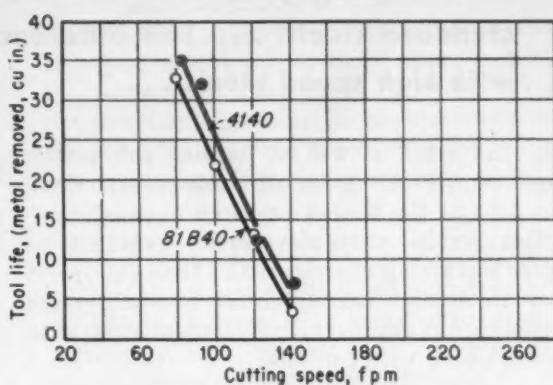


FIG. 4—Machinability of 81B40 and 4140 are practically alike. With carbides, the boron steel has the edge in the 300 to 500 fpm range.

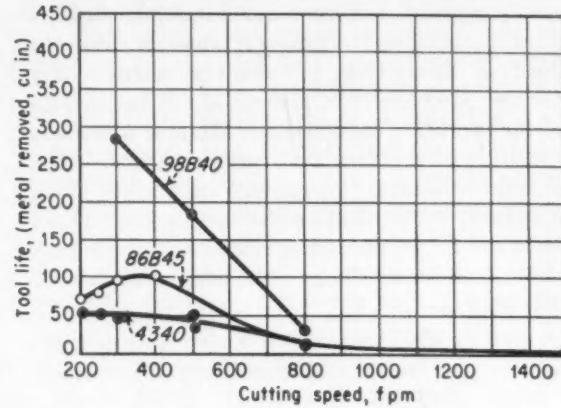


FIG. 5—The 98B40 machines better than either 86B45 or 4340, despite higher nickel content. Structure of 98B40 is sheperoidized pearlite.

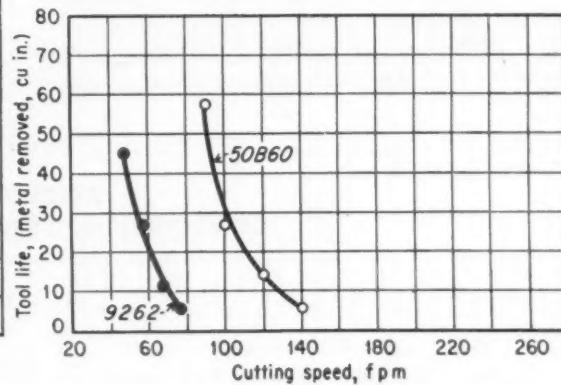


FIG. 6—High silicon content of 9262H rates it second best to 50B60 in machinability. With carbides boron grade machines 50 pct faster.

They were machined in the mill annealed state. Tool life testing conditions are shown in Table II. Data on the machining of standard alloy and boron steels were plotted on tool life v. cutting speed charts together with the microstructures of the steels tested. These charts show how the metal removed varies with the cutting speed for both carbide and high speed tools. Graphs were plotted showing the relationship between cutting

"Boron steels possess better machining characteristics than equivalent standard steels. . . . This difference is usually more pronounced in cutting with high speed steels . . . "

time and speed as well as forming end quench hardenability curves for all steels tested. Work was done by the Metcut Research Associates.

Test results show the boron steels possess better machining characteristics than equivalent standard steels. This difference is usually more pronounced in cutting with high speed steels than in machining with carbides.

It must be noted that the structures machined and compared are not equivalent. Past experience shows that microstructure has a marked effect on machinability and if equivalent structures had been compared, different machinability results might be obtained. However, since it was the object of these tests to compare commercially annealed steels, which are usually processed in the "as received" condition, no attempt was made to machine structures that were identical. Also, the more silicon or manganese in a given steel, the greater is its effect on the cutting tool. These effects are more marked in machining with high speed steel as carbides are less sensitive to abrasiveness.

Following are comparisons drawn from test results on the boron and equivalent alloy steels studied.

14B45 v. 1345

As would be expected from the composition and structure, the boron steel machines slightly better than the 1345.

The difference in machinability is probably due to the fact that 1345 contains about 2.5 times

as much manganese as 14B45. With high speed steel for a tool life of 60 min, the boron can be machined at a speed almost 100 pct higher than the 1345 steel, Fig. 1. With carbides, for an identical tool life, the two steels machine practically alike. The boron steel possesses slightly better machining properties in the higher speed range.

94B17 v. 4817H

The 94B17 steel can be machined at higher cutting speeds than the corresponding steel, 4817H. The better machinability of the 94B17 may be traced to its more machinable microstructure, 60 pct ferrite, 40 pct pearlite compared to spheroidized Widmanstatten and its lower alloy content. The relative hardness of the two steels are related to their microstructures. With both highspeed steel and carbide tools, the 94B17 can be machined at about 20 pct higher cutting speed than the 4817H. Carbide tools were used in Fig. 2.

80B40 v. 8640

With a structure of 65 pct pearlite and 35 pct ferrite the 8640 steel should machine better than the 80B40 with its 100 pct pearlite structure. However, tool life curves show the boron steel to have slightly better machining characteristics.

This may be due to the fact that 80B40 contains pearlite which is essentially in a spheroidized state and offsets the advantages of the 8640 structures. In contrast, the matrix pearlite in the 8640 steel is somewhat fine and offsets the

TABLE I

STEEL TESTED COMPOSITION, STRUCTURE, HARDNESS

Type of Steel	C	Mn	P	S	Si	Ni	Cr	Mo	Others	B	Structure, * pct	Hardness, Brn
14B45	0.49	0.74	0.014	0.025	0.21	.....	.....	.....	.....	0.0023	60P-40F	187
1345	0.43	1.80	0.027	0.033	0.28	.....	.....	.....	.....	.....	80P-20F	207
94B17	0.21	0.91	0.021	0.035	0.30	0.34	0.45	0.13	.....	0.0031	40P-60F Widmanstatten (Spheroidized)	167
4817H	0.17	0.54	0.015	0.023	0.31	3.51	0.16	0.23	Cu-0.15	.....	.....	217
80B40	0.42	0.90	0.017	0.026	0.28	0.32	0.29	0.11	.....	0.0016	100P	212
8640	0.405	0.96	0.027	0.034	0.34	0.62	0.58	0.18	.....	.....	65P-35F	212
81B40	0.38	0.84	0.026	0.029	0.27	0.30	0.31	0.12	.....	0.0027	95P-5F	207
4140	0.405	0.85	0.017	0.029	0.32	.....	0.93	0.19	.....	.....	70P-30F	202
86B45	0.43	0.83	0.020	0.028	0.28	0.48	0.76	0.13	.....	0.0025	95P-5F	212
98B40	0.43	0.78	0.009	0.015	0.35	0.90	0.78	0.19	V-0.03	0.0029	100P-Part S**	202
4340	0.42	0.75	0.010	0.028	0.29	1.73	0.81	0.25	.....	.....	80P-20F	212
50B60	0.62	0.80	0.019	0.027	0.31	.....	0.48	.....	.....	0.0009	100P (Coarse)	205
9262H	0.61	0.88	0.030	0.027	1.98	.....	0.35	.....	.....	.....	100P-Part S**	255

* P—Pearlite, F—Ferrite.
** Spheroidized.

advantage of having the larger percentage of ferrite. With carbide for a tool life of 60 min, the boron steel can be machined at a speed about 20 pct higher than the 8640, Fig. 3. With high speed steel for the same tool life, the steels machine practically alike.

81B10 v. 4140

The 4140 steel having a structure of 70 pct pearlite and 30 pct ferrite should show better machining characteristics than the 95 pct pearlite 5 pct ferrite 81B40 steel. Fig. 4 shows this is not the case.

Probably the best explanation is that the structure of 81B40, while not having as much ferrite, has the pearlite in a more spheroidized form. Both steels machine practically alike. Data obtained using high speed steel tools is shown in Fig. 4. With carbides, the boron steel seems to possess slightly better characteristics in the 300 to 500 fpm range.

86B45, 98B40 v. 4340

The structures of these steels indicate that the 98B40 should show the best machining characteristics followed by the 4340 and the 86B45. The tool life chart, Fig. 5, shows that 98B40 machines better than the other two steels but that 86B45 is easier to machine than the 4340.

The higher total alloy content of the 4340 as compared with the 86B45 probably accounts for the better machinability of the 86B45 indirectly in that the annealability of the 86B45 is better. Although the 98B40 has a higher alloy content than the 86B45 the excellent machinability properties of the spheroidized pearlite structure in this case probably causes it to show up better than the 86B45.

With high speed steel, for a tool life of 60

min, the 86B45 and the 4340 machine alike. The 98B40 can be machined at a 20 pct higher speed. With carbide, as shown in Fig. 5, it is impossible to obtain a tool life of more than 30 min for the 86B45 and 4340 steels. For the 30 min tool life, the former can be machined at a speed 20 pct higher than the latter. The 98B40 can be machined at a speed higher than the 4340.

50B60 v. 9262H

The 100 pct spheroidized pearlite structure of the 9262H steel would be expected to show machining qualities superior to that of the 100 pct coarse pearlite structure of the boron steel. However, tests show the opposite to be true, Fig. 6. The relatively poor machinability characteristics of 9262H is probably due to its high silicon content.

With high speed steel for a tool life of 60 min, the boron steel can be machined at a 50 pct higher speed than the 9262H, Fig. 6. With carbides the 50B60 can also be machined at a speed 50 pct higher than the standard alloy steel. Above 300 fpm both steels machine about the same.

Power requirements for high speed steel tools were checked in the 60 to 140 fpm range at 0.009 ipr and for the carbide tools in the 150 to 530 range at 0.009 ipr feed. Data showed that the power requirements for machining boron steels are comparable to the boron-free steels. While power requirements for high speed steel tools generally follow the hardness of the steels investigated, it is not necessarily true for carbide tools.

Tests showed little difference in the effects of various cutting fluids as far as tool life and surface finish are concerned. Results indicated a cutting fluid should be selected on the basis of cost, cleanliness or other factors.

TABLE II
TOOL LIFE TEST CONDITIONS

TOOLS						Nose Radius, in.	
Type of Tool	Tool Angles, Degrees						
	Side Rake	Back Rake	ECEA	SCEA	Relief		
High Speed Steel— Vanadium Alloys Redcut Superior (18-4-1)	15	0	5	0	5	.005	
Carbide— Carboloy 78B	6	0	6	0	6	.040	

TESTING CONDITIONS					
Type of Tool	Speed Range, fpm	Feed, ipr	Depth of Cut, in.	Cutting Fluid	Wearlond, in.
High Speed Steel	60-220	0.009	0.062	Sun Soluble Oil 25.1	0.050
Carbide.....	100-1000	0.010	0.100	Dry	0.015

MACHINE					
American Pacemaker Engine Lathe (16 in. x 30 in.) Equipped with Variable Speed Drive.					

FLUX SUPPLIES ALLOY for Hard Surfacing Manipulators



Fred H. Knibbs

Shop Superintendent
Welding and Structural Div.
Continental Foundry & Machine Co.
East Chicago, Ind.

- ◆ Alloy content of deposited metal on hard-surfaced manipulator side guards is supplied by a flux mixture rather than by the electrode wire . . . One flux in the mixture contains carbon and chrome alloys while the other is a standard flux for mild steel.
- ◆ Action of the arc on the flux is similar to that of an electric furnace when a ferroalloy is added to low-carbon steel.
- ◆ Hardness of the deposit ranges from 45 to 50 Rc . . . Low-carbon electrode wire is used for both the automatic and semiautomatic phases of the hidden-arc welding operations . . . Automatic surfacing involves 3217 sq in. of area . . . It consumes about 120 lb of electrode wire in 36 hr, including setup and preparation.

◆ HARD SURFACING by a new technique in which alloy content of the deposited metal is supplied by the flux rather than the electrode wire is used on mild steel. This procedure, devised in cooperation with the Lincoln Electric Co., Cleveland, is used on blooming mill manipulator side guards by the Continental Foundry & Machine Co., East Chicago, Ind.

Metal is deposited on both flat and beveled surfaces of the guard using a combination of automatic and semiautomatic hidden-arc welding. Deposits made thus far have been of uniform 45 to 50 RC hardness and have saved about 75 pct in time and more than 60 pct in cost over manual open-arc techniques.

Only the lower halves of the guard faces are surfaced since contact with hot steel ingots is confined to these areas. The guard is a welded fabrication of 4-in. thick mild steel plate on the face and 2-in. thick plate for backing members.

There are 12 separate surfaces to hard face involving a total of 3217 sq in. Total time required for the fully automatic welding operation, including setup and preparation of surfaces, is 36 hr. Current setting of the welding

generator is 650 amp at 34 to 35 v. This phase of the job consumes about 120 lb of 7/32-in. low-carbon electrode wire.

Preliminary tests were made with various flux combinations to determine the proper mixture. Deposits about 3 in. long were made, using the different flux mixtures, and their hardness measured. These are listed in Table I. Of the two fluxes used, one is a standard No. 780 flux for welding steel while the other is a new hard-surfaced flux, No. 550, which contains the alloy for obtaining the desired hardness. Since an 80-20 mixture of the fluxes provided the hardness values desired, it was used for both the automatic and semiautomatic operations.

The semiautomatic phase of the hard-surfacing operation requires 2½ hr. The current setting is 350 amp at 33 to 34 v. Electrode wire composition is the same as for automatic surfacing but the diameter is 5/64 in.

The equipment used for the semiautomatic operation is standard and can be used at high arc intensity for good penetration and high speed if desired. However, in hard surfacing, excessive penetration is not desired since a

greater mixture of base metal in the deposit lowers the hardness of the overlay. Therefore, penetration is reduced by setting the current at a low value and making the electrode negative.

The alloy-supplying flux No. 550 is an agglomerated material containing sufficient carbon chrome and molybdenum to produce a semiaustenitic deposit. An undiluted deposit contains about 0.75 pct C and 7 pct Cr.

During hard surfacing, the action in the arc is similar to that in a small electric furnace at the time a ferroalloy is added to a bath of low-carbon steel. In surfacing, as much flux as possible must enter into and become part of the deposit because it contains the hardening alloy. This action is promoted by the high arc voltage which allows a greater dissipation of heat around the arc to melt the surrounding flux. The effect of arc-voltage variation is illustrated in Table II.

Hard surfacing with the No. 550 flux should meet certain basic conditions. With a current setting of 400 amp at 32 v, travel speed of 30 ipm and a $\frac{1}{8}$ -in. electrode connected negative, the resulting deposit will average 55 Rc hardness and have a value of three in abrasion. The weight of fused slag is 1 lb per pound of deposited metal for a stringer bead and 0.9 lb for an oscillating bead.

Nominal chemical analysis of a deposit having the best abrasive value is 0.60 pct C and eight to ten times that amount of chromium. If the base metal has less than 0.25 pct C, the electrode wire should contain more carbon. However, the greater amount of carbon in the deposit comes from the flux.



AUTOMATIC hard surfacing takes 36 hr to face 3217 sq in. of a blooming mill manipulator side guard. Time includes setup and preparation.

TABLE I

DEPOSIT HARDNESSES

Flux No. 550, pct	Flux No. 700, pct	Hardness	
		Rc	Bhn
30	70	21	229-241
50	50	34	321
80	20	47	444

TABLE II

EFFECT OF ARC VOLTAGE VARIATION

Arc Voltage	Plate, pct C	Hardness, Rc	Abrasive Value ^a	Single-Pass Deposit	
				pct C	pct Cr
28	0.14	47	9.1	0.40	3.18
31	0.14	53	3.56	0.70	5.92
29	0.23	54	10.5	0.40	3.00
31	0.23	55	3.08	0.78	5.90

^a Abrasive value equals grams lost per minute against constant pressure i.e., the lower the number, the greater the abrasion resistance. Tests were made using 5/64-in. low-carbon electrode, connected negative, 380 amp, travel speed of 14 ipm.



HARD-SURFACING beads on beveled guard faces are laid down by semiautomatic hidden-arc welding. Flux mixture supplies alloy content.



UNIFORM DEPOSITS on the lower half of guard face have a hardness of 47 Rc as a result of alloy content absorbed from flux mixture.

Get faster response—

METAL-CERAMIC WALL . . .



By P. B. McSherry

Supply Dept.
The Bristol Co.
Waterbury, Conn.

- ◆ Thermocouples used to check temperatures of molten brass or checker bricks of open-hearths now have a longer life expectancy . . . chalk that up to application of a new metal-ceramic . . . Because wells have a single $\frac{1}{8}$ in. wall in place of the old double wall, response to temperature fluctuations is more rapid.
- ◆ There's 77 pct chromium metal and 23 pct aluminum oxide by weight in the new material . . . The metal adds thermal conductivity and shock resistance . . . The aluminum oxide has a high melting point, gives resistance to deformation and the oxidation and solution attack of molten metals.

◆ ADEQUATE PROTECTION for thermocouples used in molten metals has always been a problem. Heavy-section tubes, double tubes, and refractories that protect couples from corrosion and mechanical damage at high temperatures also insulate the thermocouples and slow down their response. Recently a combined metal-ceramic material tried out for thin-walled wells has proved successful in some troublesome hot metal applications.

The metal-ceramic material, tried by The Bristol Co., is Haynes Stellite Co.'s LT-1. It contains about 77 pct chromium metal and 23 pct aluminum oxide by weight. The material has properties not available in either metals or ceramics alone. The metal adds thermal conductivity and shock resistance. The nonductile ceramic constituent has a high melting point and imparts resistance to deformation and to the oxidation and solution attack of molten metals. One of the most attractive properties of the material from a protection tube standpoint is its high thermal conductivity compared to pure ceramic materials. It is about the same as cast iron.

Lengthens Thermocouple Life

The metal-ceramic wells have shown considerable promise in openhearth checker systems. Accurate temperature control in openhearth regenerative systems is necessary for efficient operation. Checker bricks fail when allowed to get too hot, and are expensive to repair. However, it is desirable to operate the regenerative system at the highest possible temperature short of checker failure. Furnace time for openhearth operations is almost inversely proportional to air preheat temperature. The optimum temperature is about 2450°F. Many operators feel this temperature provides maximum air preheat with minimum deterioration of the checker bricks.

Before the metal-ceramic was used the protection tube was inserted in a heavy-walled secondary tube to protect the couples from the hot gases and erosion from gas-borne particles. Tubes lasted less the time between general overhauls. The double-tube installation caused a considerable delay between the actual temperature changes in the gases and the recording of the changes by instruments. Compensating devices had to be added to the temperature recorder to allow for the temperature differential between the thick outside and inside tubes.

With the metal-ceramic well it is unnecessary to use such devices and more accurate temperature control is possible. A single $\frac{1}{8}$ -in. thick wall is adequate for the metal-ceramic wells. There is now very little delay in noting temperature changes, operators have better control and can use optimum preheat temperatures.

In the first installation, average life of these metal-ceramic wells was $2\frac{1}{2}$ months. This includes tubes broken before installation as a result of improper handling. The first tube used in the installation lasted $4\frac{1}{2}$ months, well beyond the normal period between general overhauls. In many instances, the metal-ceramic tubes last for a full campaign period.

Exhaustive tests are now underway for metal-ceramic thermocouple protection tubes to be used in measuring the pouring temperature of molten

steel. Preliminary results with this lance type couple have been encouraging.

Two applications of the metal-ceramic thermocouple wells in molten brass have been studied. Sometimes in standby service molten brass must be held over weekends and during other extended periods of inactivity in production. In this application it is desirable to hold the metal just above the melting point. The holding temperature is critical. The metal solidifies when chilled and burns or loses zinc rapidly when overheated.

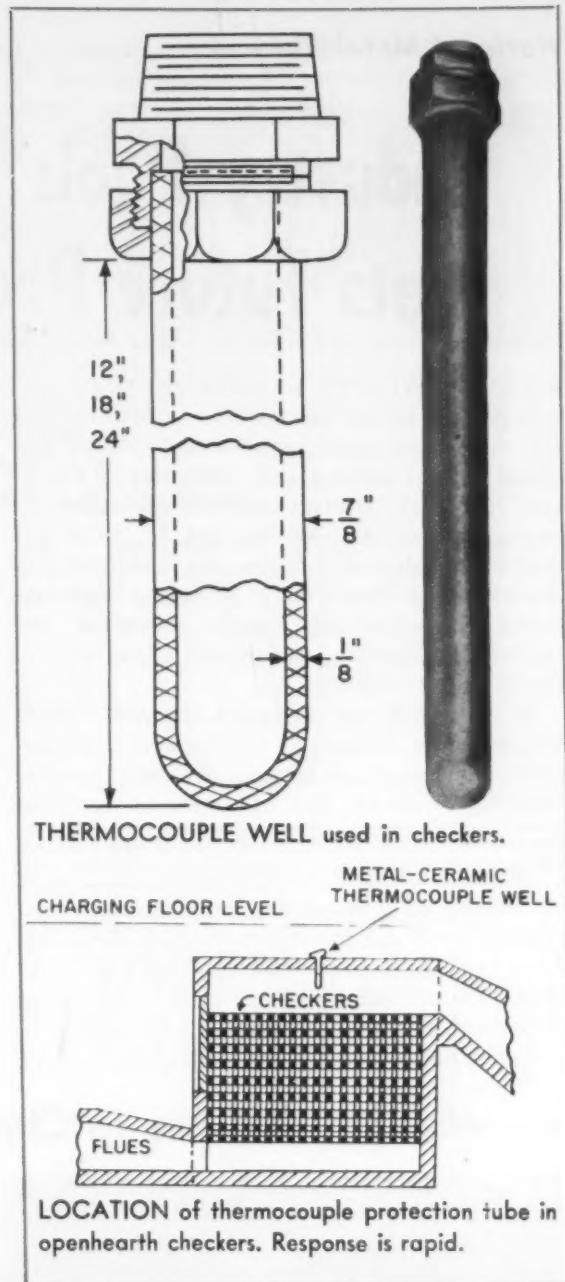
Previously a man was on duty constantly during standby periods to check temperatures on 20 or more furnaces. Now, because of the longer life of the metal-ceramic wells, the job can be done with automatic controls. Tubes have lasted 30 days and longer. None of the metal-ceramic wells have failed chemically in standby service but some broke mechanically.

Brass thermal shock greater

Another application of the new wells is in determining the optimum pouring temperature for brass. The thermocouple is dipped two or three times into each heat of brass for a minute or so. This is more severe service than encountered by the standby tubes because of the handling and the thermal shock. Also, because of the greater thermal conductivity of brass, thermal shock is more severe than that encountered by steel immersion tubes.

Before metal-ceramic tubes were used for this application, 15 immersions were considered good service. In tests at the Ansonia Branch of The American Brass Co., a metal-ceramic tube of $\frac{5}{8}$ -in. ID and 12 in. long survived 48 dips without failure. Another metal-ceramic tube with thinner walls survived 240 dips with no difficulty. Both tubes were finally broken mechanically.

While metal-ceramics are not a cureall for hot-metal pyrometry problems, they do offer an answer to many industry measurement problems.



LOCATION of thermocouple protection tube in openhearth checkers. Response is rapid.



METAL-CERAMIC thermocouple used in molten brass for standby temperatures at Ansonia

Branch of The American Brass Co. Based on a 24-hour day, tubes have lasted to 30 days.

Industry Pools Ideas Sets Future Process Standards

♦ NEW CONCEPTS of manufacturing technology and broad new process standards set the theme and gave purpose to the 35th National Metal Congress and Exposition in Cleveland last week. Management officials and engineers alike came seeking aid to meet the competitive demands facing the metalworking industry. The show's many papers and exhibits centered around the greatly improved and sharply stepped-up efficiencies of machines, methods and processes.

More than 90,000 attended the giant show and congress sponsored by the American Society for Metals, American Welding Society, Institute of Metals Div. of American Institute

Photos of new officers of the Societies, and of award winners, will be found in the News Section.

of Mining and Metallurgical Engineers and Society for Non-Destructive Testing. Over 460 firms engaged in producing, treating and fabricating metals exhibited \$25 million worth of equipment at Cleveland Public Auditorium.

Following are some of the outstanding papers

and products presented at the show:

Conservation of strategic alloying elements hinges on ability to tolerate 10 to 30 pct non-martensitic products. The effect of nonmartensite decomposition products on the properties of quenched and tempered steels may not be as great as is widely supposed. Generally, no significant damage to mechanical properties resulted compared to fully quenched and tempered steels where 10 pct nonmartensitic products are present.

Based on a study of AISI 1340, 2340 and 5140 the magnitude of the damage to mechanical properties caused by 30 pct decomposition was not the same for all three steels. However, in general, 700°F bainite present in quantities up to 30 pct has no injurious effect. As the temperature of decomposition is increased, impairment to mechanical properties is greater.

On the basis of extensive test results, it is concluded that steels of similar Jominy hardenability can be substituted for each other if not more than 10 pct nonmartensitic products are expected on the quench. If 30 pct nonmarten-

Mr. Smith Goes to Cleveland



"No record of your reservation . . .



Pretty big stuff . . .

sitic products cannot be avoided then steels should not be substituted on the basis of Jominy hardenability alone. In these cases, "microstructure hardenability" must be considered.

Charpy bar-size specimens were quenched in isothermal baths and the times necessary for 10 pct to 30 pct decomposition to ferrite, pearlite and bainite were observed. Test bar blanks were given the determined treatments for isothermal decomposition of the austenite and tempered to 150,000 psi. In these studies, transformation occurred during cooling to the isothermal bath temperature; thus the amounts

of nonmartensite decomposition products present, are not entirely the result of isothermal transformation.

In this study, a series of Charpy tests from 240°F to -320°F were made. The conclusion is reached that the difference in impairment caused by ferrite and pearlite in these particular steels may be due to a difference in amount of carbon enrichment of austenite as the ferrite is being formed.

E. F. Bailey, Effect of Nonmartensite Decomposition Products on the Properties of Quenched and Tempered Steels, Naval Research Laboratory.

Sigma Welding of Carbon Steel

Shielded inert-gas metal-arc "sigma" welding has the advantage of high welding speed, high arc-time factor, and freedom from slag and spatter. Although its application to such metals as aluminum, magnesium, copper and stainless steel has been very successful, welds in carbon steel were of poor quality until an oxygen-argon mixture was used for shielding.

Since then, Lloyds Registry and the American Bureau of Shipping have approved welding by this method, specifying the use of killed-steel welding rod and the gas mixture. Butt and fillet welds in ship-quality steel have met all specifications.

At first, only welds in killed steels would meet code specification whereas welds in other grades were completely unsatisfactory. The degree of porosity was affected both by carbon

content and the amount of deoxidation, making it difficult to determine the weldability of a particular grade of steel.

In butt welds, carbon and oxygen reacted to form carbon monoxide and carbon dioxide, believed to cause porosity by occlusion. Because silicon and oxygen combine easily to form nongaseous oxides which escape from the weld puddle, silicon bearing steels are less readily weldable.

In making fillet welds, much more plate surface is melted and therefore more free oxygen originated from the plate surface than from base plate itself. Clean plates will produce porosity-free fillet welds.

T. McElrath, Jr. and R. T. Telford, New Developments in Sigma Welding of Carbon Steels, Linde Air Products Co.



My feet are killing me . . .



But it was worth it . . .

Resists Intergranular Attack

Susceptibility to inter-granular attack of ferritic steels is not dependent on the presence of austenite. In the case of ferritic stainless steels, susceptibility to intergranular corrosion is attributed to precipitation of a carbide or nitride phase from ferrite. Ferritic stainless steels types 430, 442 and 446 are susceptible to intergranular corrosion when sensitized by rapid cooling from temperatures above 1700°F.

Addition of Ti in amounts greater than approximately eight times the carbon content pro-

vides immunity in acidified copper sulfate but not in more corrosive solutions.

Welding results in severe attack in the heat affected zone adjacent to the weld. There is some intergranular attack of the weld itself.

Susceptibility to intergranular attack of sensitized steels can be removed by a short-time annealing heat treatment at 1200° to 1500°F.

R. A. Lula and G. C. Kiefer, Intergranular Corrosion of Ferritic Stainless Steels, Allegheny-Ludlum Steel Corp.

Nondestructive Testing Moves Ahead

Technical progress in non-destructive testing has moved forward at a pace that challenges the ability of industry technicians to keep up with current developments. In addition to many members from U. S. chapters, Society for Non-destructive Testing members from England and Japan presented papers at Cleveland. Radiography, betatron, ultrasonics and eddy current methods were popular subjects in this year's comprehensive technical program.

The first year's experience with betatron testing in a large machinery works as described has led to a new appreciation of the capabilities of this type equipment. Applications peculiar only to betatron included heavy sections, multi-walled vessels and geometric magnification.

H. B. Norris, The Industrial Application of the 22 MEV Betatron, Allis-Chalmers Mfg. Co.

Thick steel sections and other common materials have been tested by betatron radiography for 3½ years at Los Alamos Scientific Laboratory. Maintenance procedures, time losses due

to breakdown, practical methods of beam alignment and focal spot corrections have been evaluated.

Shaped compensators are being used to obtain uniform beam intensity distribution within a prescribed angle.

N. C. Miller and J. D. Steely, Some Experimental Findings and Operating Practices in Betatron Radiography at Los Alamos.

Immersed ultrasonics are being used for automatic inspection of gun barrels, jet engine rotors, drill collars and aircraft frame parts. Contact or immersed testing technique are now automatically applied to such important parts as forged gun barrels and jet engine rotors.

Repetitive inspection of a large number of identical parts is now being done by automatic programming. Stepped-sequence and punched tape systems are used to set up a complete coverage of inspected parts.

J. C. Smack, Immersed Ultrasonics Inspection with Automatic Recording of Warning Signal, Sperry Products, Inc.

Embrittlement Can Be Avoided

There are at least three possible approaches to the problem of minimizing, avoiding or eliminating embrittlement in steels at high strength levels:

(1) Development of special analyses with retarded martensite tempering characteristics.

(2) The development of faster tempering steels so that overaging will occur.

(3) Development of steels in which high-strength bainite can be produced.

Although not generally recognized, the tempering characteristics of steel play a major role in the development of embrittlement. Where the structure is composed of 100 pct low temperature bainite, the steel is not subject to the same embrittling reaction. Bainitic structures display properties equal or superior to the properties of tempered martensite at all strength levels. Mixed structures exhibit lower properties.

While steel has a potential strength level range in excess of 350,000 psi, the practical useful range today is at least 100,000 psi below the potential. Investigation shows this is primarily a result of the fact that when hardened steel is tempered in the range from 500° to 600°F an anomalous decrease in ductility is observed. This is generally known as 500°F embrittlement.

Steels investigated were constructional low alloy steels including 2340, 1340, 4340 and 4330 modified.

Embrittlement in low alloy steels quenched and tempered to high strength levels is sensitive to the composition of the steel as well as the tempering time and temperature.

L. J. Klinger, W. J. Barnett, R. P. Frohberg and A. R. Troiano, The Embrittlement of Alloy Steel at High Strength Levels, Case Institute of Technology.

Highlighting the Show

Universal testing with a machine for tension, compression, flexure, torsion, hardness, and fatigue tests—including automatic load reversal drew metallurgists to the Baldwin-Lima-Hamilton Booth. The unit's recorder draws a hysteresis loop. A printer records weight at any point; an electric typewriter can be connected to type out load and strain, or punch IBM cards.

New heavy-duty tungsten carbide material permits up to 30 pct greater efficiency on heavy steel machining. Applications for Carboly grade 370 cemented carbide include locomotive wheels, gun barrels, steel-mill rolls and other severe machining operations. A unique metallurgical structure prevents deformation of tool tips up to 1800°F.

Fast, easy drilling of hard metals with an electronic drill made by Elox Corp. disintegrates the metal by a series of intermittent arcs. A hollow copper-alloy electrode serves as the cutting tool through which coolant is pumped to wash away the tiny metal particles. It drills any odd-shaped hole at any angle in tool steel, cemented carbide, Stellite and other hard materials.

Ultrasonic sound waves, put to practical use in Sperry's Reflectoscope, nondestructively tests metals and other materials for surface and internal defects. Sound waves, beamed into the material by a piezo-electric searching unit, reflect back to the unit. When they encounter a flaw, they form a definite pattern on a cathode-ray tube and indicate the location of the defects.

Oxy-acetylene shape cutting with a low-cost unit, called an Ultra-Graph, impressed many with its accuracy in demonstrations at the Heath Engineering booth. A strong magnetic field provides positive traction between a motor-driven rotor of the tracing head and the edge of a steel template. In operation, only two adjustments need to be made. A rheostat regulates travel speed and a turn of a knob adjusts torch height.

South Florida test service is conducting durability and exposure tests for 400 U. S. companies, including automotive, aluminum, plastics and rubber industries. Advantages of exposure testing at Miami include: (1) high solar radiation, (2) high humidity.

Aldip hot dip coating process developed by GM Research Laboratories to conserve strategic alloying elements is now available to industrial firms for coating ferrous metals to resist corrosion and oxidation at elevated temperatures. The process was previously limited to use in defense plants.

Complex cored brass forgings are now being made by National Cored forgings Co., Inc. on mechanical presses using closed dies, either flat or split, and movable coring punches. In this process, pressure on the metal is applied by the movable core pin. Advantages include: (1) metal savings, (2) less finishing time, (3) fewer rejects, (4) reduced machining. Applications include valves and fittings, locks, electrical connectors.

New alloy, Beryldur is a copper-base material of low beryllium content that combines properties of the high strength and high conductivity groups of beryllium-copper alloys. The Beryllium Corp.'s new alloy suggests new applications for beryllium-copper alloys in the field now occupied by phosphor-bronze and brass.

Pure elemental boron of 99 pct purity and pure borides are now available in commercial quantities from Cooper Metallurgical Associates for factory use or for pilot production.

Rolling-mill guides with special wear-resistant inserts are giving phenomenal service life in steel mills. Extended tests in large mills indicate: (1) scrap reduced up to 80 pct, (2) reduced downtime and maintenance, and (3) tonnage increase in the range of 1 to 1.5 pct.

Oxygen and nitrogen content of molybdenum to within one part per million by weight can be measured by a new vacuum-fusion apparatus using mercury cutoffs instead of stopcocks. All-glass diffusion pumps and a glass furnace envelope are used.

Amazing effect of boron in steels is now explained by its retardation of the formation of proeutectoid ferrite and upper bainites.

Powerful new nibbling machine cuts through 14-gage stainless or carbon steel, galvanized, aluminum or brass without distortion. Ideal for template making and cutting holes in tubes and ducts, this equipment is produced by Fenway Machine Sales Co.

In camshaft production—

HEAT TREATING FACILITIES Provide Versatility, Rigid Control



By **W. G. Patton**
Asst. Technical Editor

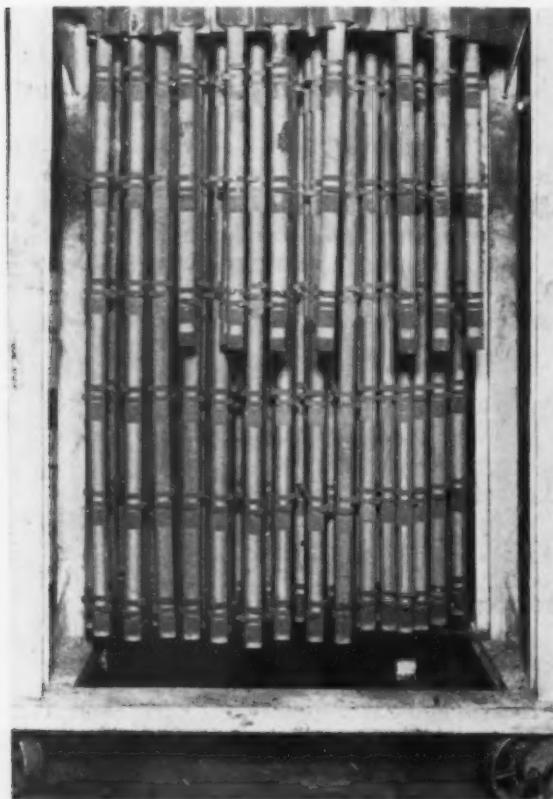
◆ PRODUCTION of camshafts for air-cooled tank engines built by Continental Motors Corp. at its Muskegon plant presents some unusual problems. The company produces 810 hp air-cooled tank engines which were developed for the Ordnance Corps. A large number of 500 hp

engines for light tanks is also produced at Muskegon as well as 375 hp air-cooled engines for other vehicles including cargo carriers.

Interchangeability of parts is the keynote for this entire group of versatile powerplants. Simply by adding additional cylinders, power can be stepped up from, say 200 hp, to more than 800 hp.

However, certain vital engine parts must be produced in several sizes. While the principle of interchangeability must be maintained, versatility has to be designed into both the production facilities and the processing cycles. Camshaft production is an excellent example.

The same heat treat facilities are used for



PRECISION HEAT TREATING of camshafts requires rigid control. Both right and left hand camshafts for 6 and 12-cylinder engines are produced by Continental's Muskegon plant.



FAST AND UNIFORM heating in this salt bath furnace prevents distortion of shafts during heat treatment. The permissible distortion of the cam during hardening is only 0.040 in.

- ◆ Fast, uniform heating in a salt bath substantially aids production hardening of precision-built camshafts for tank engines at Continental Motors . . . The same equipment handles four different shafts.
- ◆ Prior to hardening, camshafts up to 50 in. long and weighing 22 lb are heated in neutral salt in 15 min . . . Quenching in a press prevents distortion during hardening.

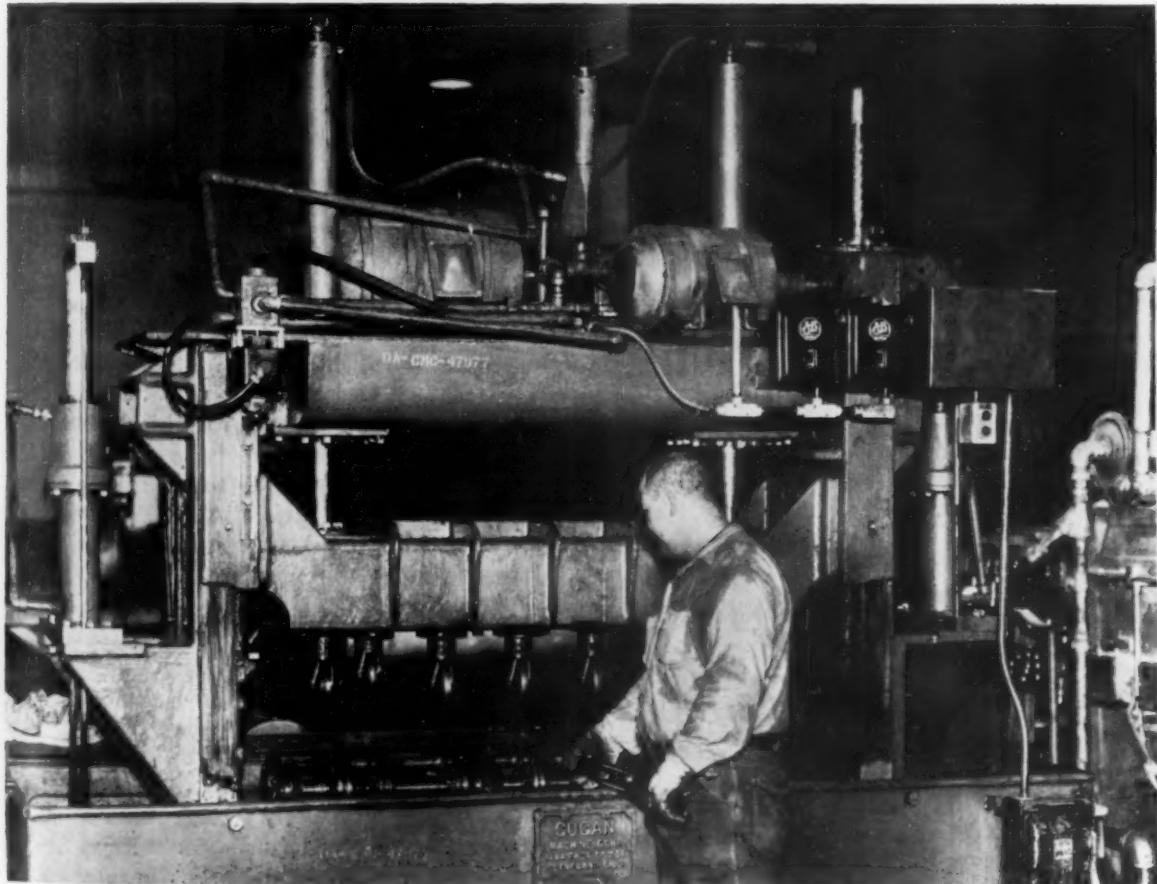
(1) carburizing and (2) hardening four different camshafts. Parts heat treated include both right hand and left hand camshafts for 6-cylinder and 12-cylinder engines. These camshafts are large, varying in length from 27½ in. to 50 in. Maximum weight is 22 lb. Permissible distortion of a hardened part is 0.040 in.

Metallurgical specifications for a tank engine camshaft are in keeping with the service requirements of the part. Failure in the field may involve a heavy penalty, both in terms of human life and loss of material. Specifications are drawn with these requirements in mind.

In selecting equipment for this precision heat treat operation, versatility as well as rigid

control had to be considered, according to Continental metallurgists. Experience showed that the fast, uniform heating provided by a salt bath not only simplified material handling but also permitted maximum production in a small amount of floor space at minimum cost.

Using an Ajax electrical heating unit, the largest camshaft used in a Continental tank engine is heated uniformly throughout in neutral salt in only 15 min. Using some other types of equipment, it was estimated that 45 min to 1 hr might be required to heat the largest camshafts prior to oil quenching. Maximum section size of the largest air-cooled camshaft engine built by Continental is 2½ in.



STANDARD Gogan quenching press is used by Continental to prevent distortion during hard-

ening. The equipment has 7 sets of adjustable rollers to rotate shafts during quenching.

Because of the limited availability of nickel, SAE 4620, originally specified for Continental camshafts, has not been available. During the emergency, SAE 8617 has been substituted.

Carburizing of the camshafts is carried out in Leeds and Northrup Homo Carb furnaces at 1700°F. Carburizing temperature is 1700°F. Parts are held at this temperature for 8 hr. During this time, furnace atmosphere is precisely controlled so that carbon content of the case is held within the unusually narrow range of 0.90 to 1.00 pct. Case depth is normally 0.045 to 0.050 in.

Depth of case is usually held on the high side, depending somewhat on the desired core properties. Carburized parts are cooled in air.

Close control of the carburizing atmosphere is an important factor in meeting the hardness requirements of the case of 60 RC min. To meet these requirements, retained austenite in the case must be practically negligible.

Following the carburizing operation, camshafts are placed on racks and transferred to the Ajax neutral salt bath used for hardening. Heating capacity of this electric furnace is 200 lb per hr. This makes it possible to heat even the largest camshafts in 15 min.

Carburized camshafts are placed in the furnace at 5 min intervals. Each time a part is removed for oil quenching, it is replaced in the salt bath by another part. The 5 min interval makes it possible for the cam operator to load the salt bath and quench the part in a Gogan press.

Temperature of the salt bath is normally

1460°F but this may be varied as much as 20°F to give the desired core hardness of RC 20. Variations in the analysis of the steel and other factors make it desirable to vary the hardening-treatment to give the required core micro-structure and hardness.

As shown in the cut, the parts are loaded and unloaded by hand by a single operator. Salt used in the neutral bath is Houghton's 1145 or Aero Heat 1200. A definite quantity of $\frac{1}{4}$ in. pellets is added each morning at the start of the day's run to insure neutrality of the salt. Additions are made as needed.

A simple check is made during production to test the condition of the salt bath. An ordinary thin razor blade is used for this check. After holding in the salt for a few seconds, the blade is removed and quickly cooled to room temperature. If the blade bends much more readily than a new razor blade, the possibility that the bath has become decarburizing is investigated. This simple check has worked very well at the Continental plant.

Part rotated during quench

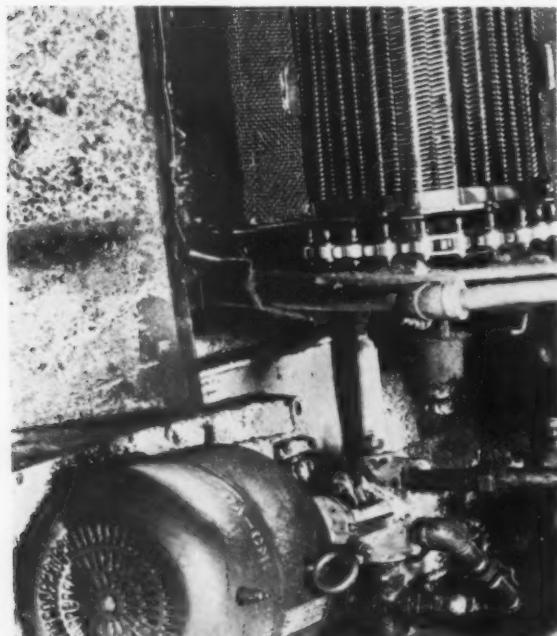
Cams are supported in the salt bath on a special hanger. This is lifted part way from the bath and hung on a bar. The cam is then removed with tongs. It is bumped on the side of the tank to remove the salt in the center-drilled hole in the end of the cam prior to quenching. The part is then inserted in a standard Gogan press for quenching in oil.

During quenching, the part is slowly rotated on rollers. The rollers are adjustable so that each triangular set of 3 rollers contacts the part at a bearing location. At Muskegon, the press is equipped with 7 sets of rollers.

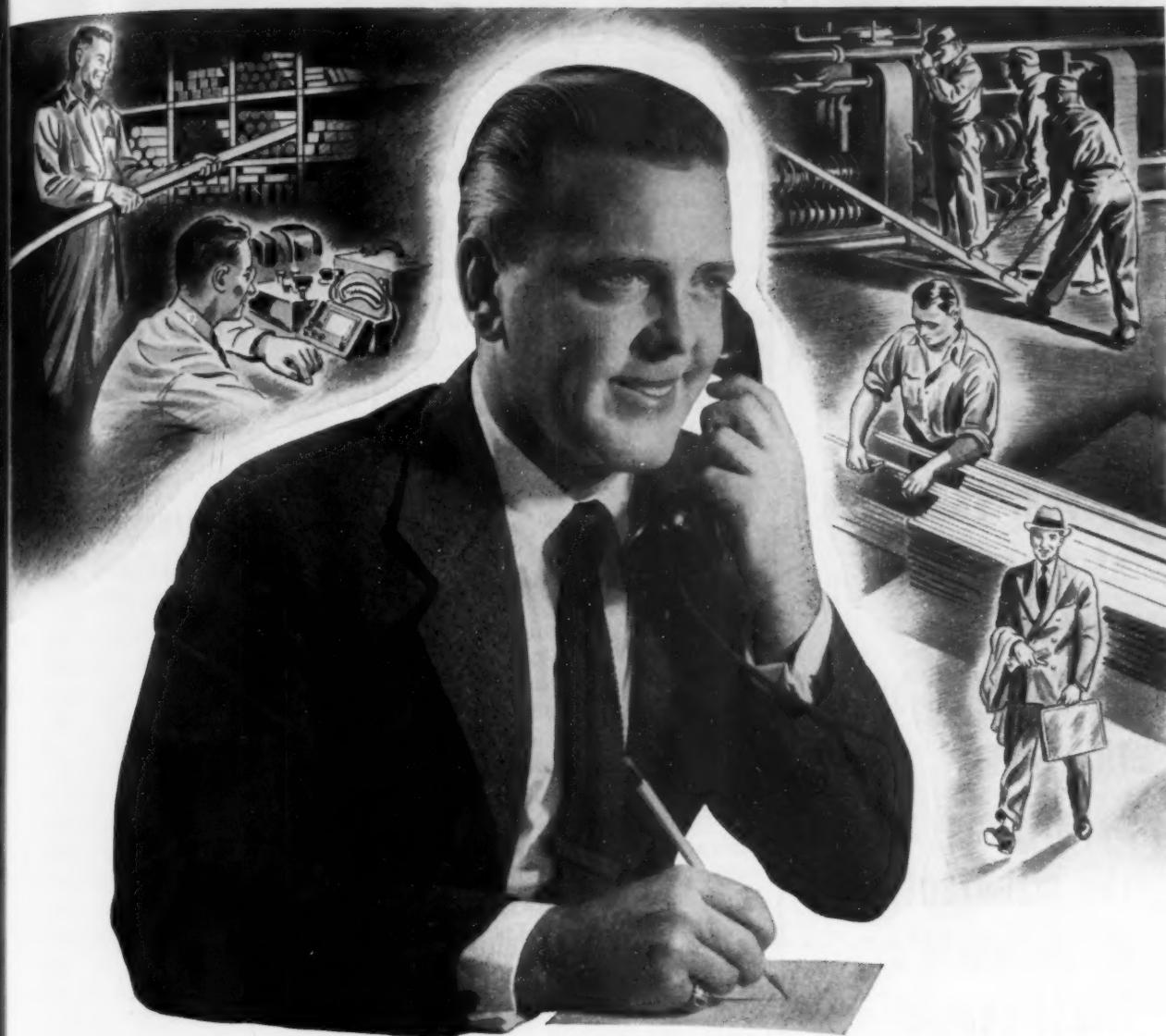
Intensive agitation of the oil bath is provided in part by a series of 7 jets located on each side of the tank. Jets are adjustable to provide maximum cooling at the critical bearing areas. All quenching oil is passed through a Bell & Gosset heat exchanger. Capacity of the oil pump is 60 gpm. Oil temperature is held at 110°F max. Oil jets are bled off the main oil lines near the storage tank located in the basement of the building. An auxiliary pump is used to provide necessary circulation. Parts are held in the press a minimum of 3 min.

After hardening, cams are ground all over except for bearing areas and lobes, then shot-peened in an American Wheelabrator cabinet to improve fatigue resistance. The bearing areas and lobes are semi-finished ground.

Following straightening (if necessary) cams are gun-drilled and double-reamed the entire length. They are again stress-relieved in a Lindberg batch-type furnace for 2 hr at 325°F and precision straightened. The bearings and lobes are finish-ground and polished and machining of the large end is completed.



TO MAINTAIN TEMPERATURE of the oil at 110°F max, powerful pumps and a Bell & Gosset heat exchanger are used. Shown above is the auxiliary pump. Seven jets agitate the oil bath.



CONTACT MAN FOR AN ORGANIZATION SERVING YOU

In Los Angeles his name may be Joe, in Cleveland it may be Harvey. Like his "brothers" in principal cities throughout the country, he is *your* key to more helpful information and *complete assistance* in the use of tool, alloy, or stainless steel. He's the fellow on the telephone order desk at your nearest Carpenter MILL-BRANCH WAREHOUSE.

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WAREHOUSE organization. It embraces "trouble-shooting service" right in your own plant. It is backed by trained delivery crews and modern equipment to process orders, fast.

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Truly, it's almost like having a specialty steel Mill right next to your receiving dock!

Whenever you want specific job recommendations or help with a problem, get it by calling Carpenter. Try it and see. Simply pick up your phone and talk to the man on the order desk at your nearest Carpenter MILL-BRANCH WAREHOUSE or Distributor. He'll put you in touch with the person who can help you. The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.

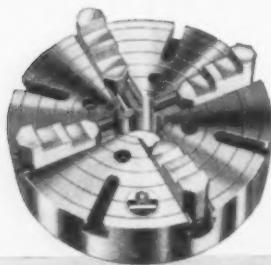
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Technical Briefs

Engineering

HEAT TREATING:

Martemper steel helicopter spars in 30-ft salt baths.

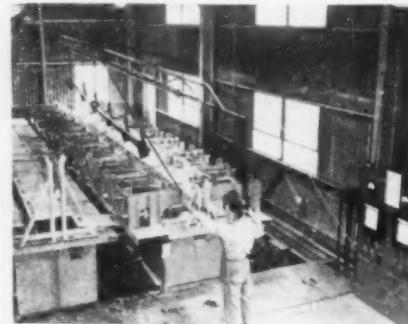
Special 30-ft salt bath furnaces have been developed to handle the heat treating operation required for a 20-ft plus steel spar required for a Piasecki helicopter rotor blade.

The steel spars, main load carrying members, are martempered in what are believed to be the world's longest salt baths used for isothermal quenching. The unique treating process was recently unveiled at the Piasecki Helicopter plant in Morton, Pa.

Hardening a hollow piece of steel over 20 ft long, and of varying section shape and thickness, presented many problems. Distortion was a major concern. The fixture used for holding the spars had to be of special design because of its length. The martempering operation results in minimum physical distortion.

The bath in one Ajax furnace is 30 ft long, 1 ft wide, and approximately 2 ft deep. The second furnace is 30 ft long, 1½ ft wide and 3 ft deep. The two furnaces combined are rated for 480 kw.

The isothermal quenching process comprises essentially a pre-heat of the cold-worked, 90-lb spar by suspending it just above the molten salt. Next the piece is immersed in the high temperature Ajax salt bath furnace. The spar is transferred to the low temperature furnace—a salt bath quench. After rinsing, the spar is ready for final processing.



OPERATOR GUIDES spar for helicopter rotor into 330 kw Ajax high heat furnace at Piasecki Helicopter Corp., Morton, Pa.

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 73. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

MATERIALS HANDLING:

Simple adjustment makes rubber conveyor shed, retain water.

A rubber conveyor belt that will shed or retain water from the material being handled is now helping in the production of taconite. The belt originally designed by the B. F. Goodrich Co., Industrial Products Div., Akron, Ohio, for gold dredging use in stacking wet rejects, can be used in handling wet cement, sand, gravel and other like products.

The belt automatically dewateres finely ground taconite as it conveys the wet material from storage tanks for processing. A simple adjustment makes the belt retain water with equal ease.

Flows Off Edge

Secret of the "Riffle Grip" belt's dual performance lies in its unique cover design. Molded rubber ridges standing $\frac{1}{8}$ in. high are formed in a continuous series of chevron patterns several inches apart.

Operating on a predetermined conveyor incline angle, with belt idlers also placed at a specified angle, the chevron-like ridges channel water to the edges of the belt where it flows off. The material conveyed rests in the center of the belt and makes the trip free of water.

Adjustment of the conveyor incline angle and the angle of belt idlers changes the chevron patterned surface into a series of horizontal ribs which retain water on the belt and permit even dis-

and Production Ideas



MOLDED, chevron-like rubber ridges on the surface of this conveyor belt can be adjusted to shed or retain water contained in materials it conveys.

tribution of moisture through the material.

Negotiates Steeper Inclines

Adjusted this way, the belt handles wet mixed concrete and similar moist materials on steeper inclines than can be negotiated on a smooth surface belt. The Riffle Grip design permits even distribution of the water through the material and prevents the water from flowing to the center of the belt to dilute the material causing it to slide back on an inclined conveyor.

Designed originally for gold dredging use in stacking wet rejects, the belt has been successfully used in sand and gravel plants where wet sands and gravel must be conveyed up steep inclines for stockpiling.

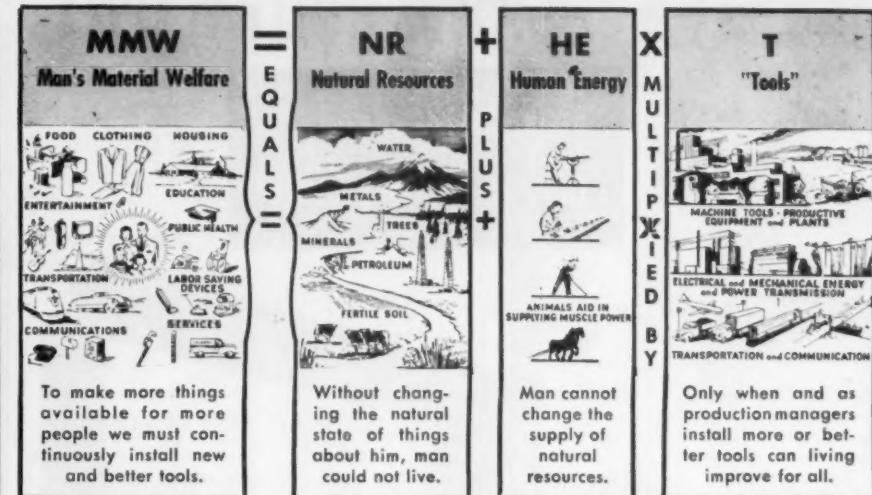
AUTOMATIC CONTROL:

Tape recorder will memorize, repeat machine operations.

An industrial tape recorder that records motion instead of sound will act as a magnetic memory for storing machine operations. When played back on the machine it is to control it will repeat and control the process cycle automatically. The compact magnetic tape eliminates bulky patterns and templates and requires little storage space.

The first of these controls, built by General Electric Co., will be

Turn Page



"To Have or Not to Have?" Is a Question of "Tools"

The above paraphrase from Shakespeare is the real key to the high standard of living in the United States.

It is no accident that this country has 72% of all the automobiles in the world, 61% of the telephones, 92% of the bathtubs and a comparable superiority in most other things making up man's material welfare.*

The reason for this fantastic superiority in "having" things is our greater use of "tools" for multiplying man's energy. The equation above graphically portrays this.

We have increased output per hour of work about 7½ times since 1850 only by constantly putting newer and better "tools" to work in industry. This fundamental truth is too often obscured in complex discussions of money, banking, distribution, wages and other phases of economics. Once the bedrock basis of our system is thoroughly grasped, all else falls into its proper place and proportion. "Tools" are the key. What serves to provide more and better "tools" is good. What serves to limit, or destroy, greater use of "tools" is bad.

The contour-cutting band machine is one of the ingenious tools used to increase man's ability to produce more goods for himself. It was originated by The DoALL Company.

This machine tool bandsaws a narrow slot in metals, wood, and, in fact, in any solid substance. There are 18 different kinds of band tools for use with these machines to do a thousand different kinds of operations.

If a material is too brittle or hard to saw—like glass or granite—then the band tool employed is impregnated with diamonds, or has tiny blocks of grinding

*Source: Industrial Relations Center, University of Chicago.

wheel material mounted on it. If the material is to be polished, there are abrasive bands which can polish any material, including tungsten carbide. Thus, this same machine can sharpen carbide lathe tools. If the material is to be filed, a band of files is employed (some thirty different styles and shapes of file bands are available). If the material is pliable—like sponge rubber or paper—the band tool employed has a knife edge which slices through the substance.

Complete information is available from The DoALL Company, Des Plaines, Illinois, or any of its 38 Sales-Service Stores listed in local phone directories. These stores also carry cutting tools, gaging equipment, precision surface grinders and many other products.



SHAPE CUTTING, a job done best, fastest and cheapest on a DoALL Band Machine.

DoALL

FREE ON REQUEST for your bulletin boards: "Why Living Improves in America," a 17" x 22" wall chart, without advertising matter.

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Steel window casings mass produced under contract to specifications featuring mortise and tenon design for quick on-the-job assembly. Shipped knocked down for convenient and economical handling. Manufactured through Brandt's vast forming, shearing, bonderizing, and painting facilities...

FORMINGS • STAMPINGS • WELDMENTS



Even in so small a part as this simple operator arm — from shearing to blanking — Brandt's facilities afford economical mass production.



CHARLES T. BRANDT, INC., BALTIMORE 30, MARYLAND

—Technical Briefs—

used by Gidding & Lewis Tool Co., Fond du Lac, Wis. It is expected to double production of a milling machine making self-reinforced "skid" structures for jet aircraft.

Duplicates on Playbacks

A skilled machinist or tracer control runs the machine through a series of motions to produce the first piece of work. Motions are translated into electrical signals by selsyns and recorded on the magnetic tape through an electronic circuit. Nonproductive motions such as tool setting, gaging, template changing and stop settings are not recorded.

When the tape is played back through the machine it automatically duplicates original motions and produces a part identical to the one made while recording. Repeat orders can be produced economically by taking the specified tape recording from a file and inserting it into the control.

Has Many Applications

The control may be used in many applications but must be individually engineered to suit each installation and co-ordinated with the design of the machine it is to control. Since the equipment is relatively expensive, many possible applications are eliminated by economic considerations.

Possible applications include milling machines, die-sinking machines, flame cutters, and others. This type control can also be applied to opening and closing valves, modulating fluid flow, operating hydraulic and pneumatic controls, and controlling temperature, pressure, humidity, weight, visual density of fluid, conveyor speed, and so forth. Simulated testing—recording in the field and playing back in the factory—is another application.

Eliminates Patterns Templates

Compactness of the tape makes it an ideal storage medium for machine and process cycles, eliminating bulky master patterns and templates.

The length of cycle controlled depends on the diameter of the

Technical Briefs

reel and the speed at which it is recorded and played back. On the Giddings & Lewis machine a standard 14-in. diam reel is expected to run a 1-hour cycle.

Recordings can be erased easily, for re-use and may be cut and spliced if only part of a work cycle has to be changed. Playbacks up to 10,000 times are possible without appreciable loss of the controlling signal. There is no loss of signal in storage.

This system offers complete coordination of all machine or process variables such as continuous control of feeds to produce desired contours — multiple passes, change of spindle speed and synchronization of many other functions of the cycle.

Reduces Set up Time

Operator know-how can be incorporated into the automatic cycle compensating for backlash, take care of machine inaccuracies, spindle deflections and tool loading.

High production economies for low or medium production jobs are possible and automatic and semi-automatic cycles can be used where they formerly were impractical. Minimum set-up time is required since only the record tape and tools need changing.

The equipment consists of two components: the magnetic tape recorder and the electronic control panel.



EXHAUST FENCE situated about 100 ft behind 6 engine Boeing Stratofortress deflects the exhaust upward. Curved vanes in the especially designed fences fabricated by Armcro Drainage & Metal Products, Inc., Middletown, Ohio, deflect the exhaust gases from a horizontal to a vertical plane.

Turn Page

TWO MILLION WITHOUT A FAILURE!

parts: small connecting rods

alloy: "600" series metal, a high strength bearing bronze that contains no tin

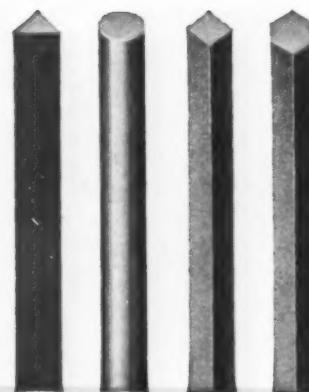
quantity to date: over 2,000,000

number of failures: none

forged by: Mueller Brass Co.

advantages: no bearing insert is necessary on either the wrist pin or crankshaft end because each rod acts as its own bearing. Dense homogeneous grain structure, close dimensional tolerances and high mechanical properties often permit redesigning for weight savings as high as 15% to 25%. "600" alloys have low coefficient of friction, high resistance to corrosion and tensile strength 2½ times greater than cast phosphor bronzes.

uses: compressors, outboard motors, small high speed gasoline engines. Best results are obtained if they operate against hardened, ground and polished shafts.



"600" SERIES ROD is produced in standard 12-ft. mill lengths and a wide range of sizes and special shapes. This rod has a fine, uniform grain structure and the mechanical properties are rigidly controlled in the cold drawing process. Scrap loss is greatly reduced in machining operations because of the complete absence of defects. For complete information, write us today.

104

MUELLER BRASS CO.
PORT HURON 24, MICHIGAN

TRUCK TESTING:

Make your own maintenance tests on electrical fork trucks.

One way to maintain your electric fork trucks at top efficiency is to test them in your own plant. If these trucks are not operating at a power consumption rate of 100 to 120 watts per ton, per mile, per hr, they are probably operat-

ing inefficiently and may be on their way to breaking down. Both fork-lift and platform lift trucks can be evaluated for efficiency with this test.

By making a few observations and a few calculations, figures may be obtained showing the equipment condition. From this information major repairs or minor adjustments may be indicated.

Procedure for making hoist-speed measurement tests are as follows:

Making Hoist Observations

Measure off and mark with chalk two 2-ft vertical distances, one on the main and one on the telescopic member of the hoisting mast and chalk off one indicating mark at the middle of the vertical part of the fork assembly and another near the bottom of the telescopic mast.

Start the hoisting mechanism. Start your watch as a selected point on your fork assembly passes the zero chalk mark on the telescopic member, record the ammeter and voltmeter readings in the "hoist performance" table on your form.

Stop your watch as the point passes 2-ft chalk mark. Record the time for the fork assembly to traverse the 2-ft interval. Repeat the above procedure recording the ammeter and voltmeter readings and the travel times involved in the elevation of the telescopic channel assembly through the measured 2-ft interval.

Now Load Truck

Now pick a capacity load, weigh the truck with load and repeat all of the previous procedures, this time recording the data in the "truck loaded" columns.

When these readings are recorded, make right and left turning-radius measurements and forward and reverse tilt measurements.

Part I of this article, prepared by H. Milk, Chief engineer, Mercury Mfg. Co., Chicago, appeared in the October 1 issue of The Iron Age, p. 124.

FURNACE TEAR OUTS SALAMANDER OR SLAG REMOVAL MATERIAL HANDLING



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Usual procedure for turning-radius measurement is to successively steer the truck through clockwise and counter-clockwise circles with the minimum available turning radius (steering hard over) and drawing the turning circle on the floor by means of a chalk stylus positioned at the projecting rear corner. Measurement of this inscribed circle will give the turning radius in the direction operated.

Technical Briefs

Why 88-Ft Distance Is Used

The 88-ft distance simplifies calculations because 88 ft/min equals 1 mph. If the 88-ft run is timed in 10 sec, the truck is traveling $\frac{88}{10} \text{ sec}$ or 8.8 ft/sec, or 6 mph. From this the four travel-speed figures—forward and reverse, light and loaded—are obtained. Forward and reverse readings are taken to assure that the truck operates with equal ease in both directions, or to indicate defects such as brush mis-alignment.

Keep Batteries Up

Because industrial-truck batteries in constant use are sometimes below rated voltage levels, corrections must be made on the "recorded" travel calculated speed reading by multiplying it by *rated voltage* and dividing by *actual read voltage*.

For example, if measured travel speed is 6 mph, the truck is powered with a 15-cell lead-acid bat-

tery of 30-volt rating, and our voltmeter reading during test is only 28 volts, calculation is as follows:

$$6 \text{ mph} \times \frac{30 \text{ volts}}{28 \text{ volts}} = 6.43 \text{ mph}$$

This procedure follows with all "recorded" values to get corrected (or true) mph figures.

TOOL GRINDING:

Don't lap or superfinish a cemented carbide tool for rough cuts.

Tool life during average machining of steel is better if tools are used in the as-ground condition. Tests show lapped surfaces on carbide tools create more friction and result in shorter tool life.

Surface finish on a carbide tool tip has little effect on tool life for average machining on steel, according to Carboly Dept. of General Electric Co., Detroit. During roughing operations, carbide tools perform satisfactorily whether they are ground on a diamond or silicon carbide grinding wheel—

or even if left with the surface in as-sintered condition.

As-sintered carbide tools provide a tool surface finish of 30 plus microinches. Those ground on silicon carbide grinding wheels provide 15 plus microinches. Eight to 15 microinches are obtained with diamond grinding wheels, and lapping and super finishing reduce surface finish to 0.5 to 5 microinches.

Tests conducted at Carboly indicate a lapped or superfinished tool fails more rapidly in making roughing cuts than one ground on a diamond wheel.

Tools used for finishing and precision finishing aluminum, magnesium and other similar metals, must have a good surface finish. Lapping of the top face and cutting edges is a must for good tool life.

For a precision finishing operation involving steel, it is necessary to finish grind the tool cutting edges with a diamond wheel.

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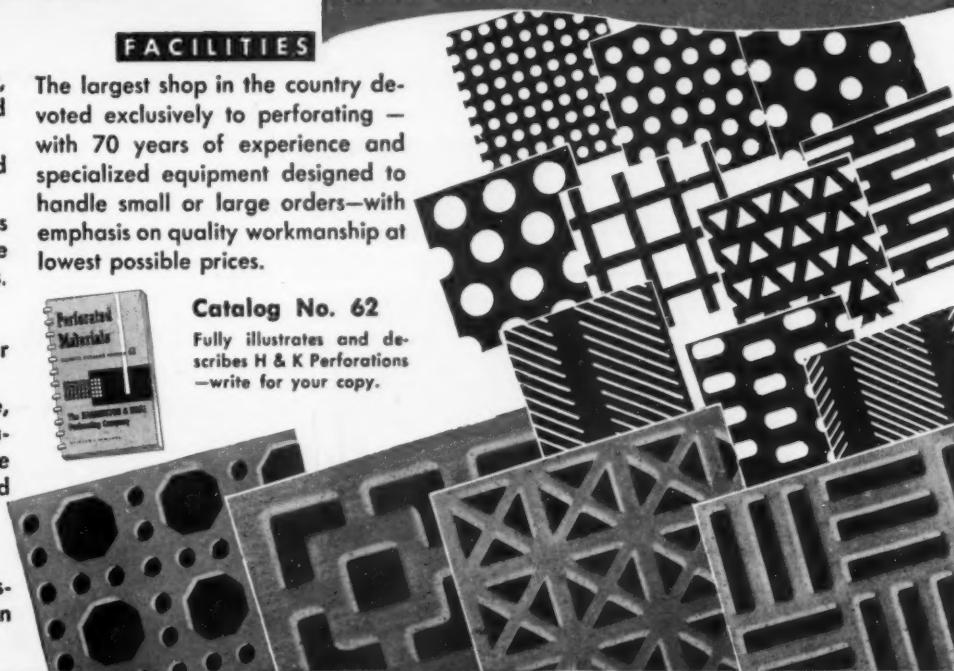
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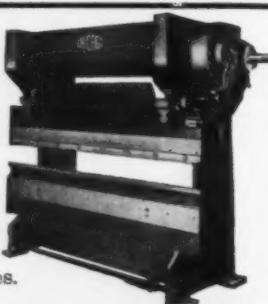
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The Iron Age

THE IRON AGE SUMMARY...

- Market changes testing buyers as well as sellers
- Some buyers seem confused; others show push
- Scrap prices gain again; operations slip a point

Recent changes in the steel market are testing the mettle of steel users as well as producers. In fact the selling problems of producers have been stressed so much that many people seem not to have noticed that steel buyers face challenging problems too.

Proper buying policy will vary according to amount and kinds of products made and amount and kinds of steel used. Long lead time (perhaps as much as 9 months) is required between buying of steel and final inspection of a completed jet engine. But a manufacturer of simple parts may be able to operate with only a few days' supply of steel. In between there is plenty of leeway called "buying policy" or "judgment."

Alert purchasing men operating in this no-man's-land are saving their companies money. But, like the sellers, some of the buyers were caught flat-footed by the changing steel market.

Buying confusion is evidenced by the following: (1) Some buyers got hung up with commitments for conversion, foreign, or premium-priced steel after it was available at regular mill prices. (2) Some are paying extra freight for material that could be bought closer to home. (3) Some trimmed inventories too quickly, some too deeply: mills have received phone calls and telegrams asking that cancelled orders be restored. (4) Some have not seized the opportunity to avail themselves of alternate sources of supply without materially increasing costs.

On the positive side of the ledger, many purchasing agents have shown a remarkable grasp of the steel market. They have reacted quickly and audaciously—altering their buying policy to fit the market.

Some steel buyers are even taking the initiative—asking suppliers what they intend to do about meeting lower delivered prices.

Judging by consumer reactions so far, it is likely that steel business will be good for at least the next 6 or 8 months. Here are the reasons:

► Inventory correction is about two-thirds completed. Some major consumers are re-entering the market now; others are expected back in November.

► Steel users will enter the new year with inventories at "optimum" size. This should pave the way for a seasonal upsurge because in steel as in many other things spring is usually a time of greater buying.

► Extra buying incentive will come from approaching steel wage negotiations. Most steel wage contracts expire in their entirety next June 30, and the United Steelworkers is already busy polishing its case for higher pensions, social insurance, and wages, and a form of guaranteed annual wage. A good many experienced steel buyers will decide they cannot afford to be caught with their inventories down—just in case labor trouble interferes with steel production.

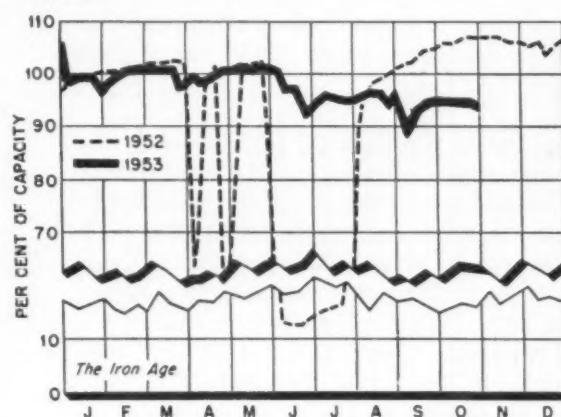
Scrap prices continue to show strength this week, advancing THE IRON AGE Steel Scrap Composite Price \$1.34 a ton to \$34.17 per gross ton.

Steel Operating Rates

	Week of Oct. 25	Week of Oct. 18	Week of Oct. 25	Week of Oct. 18
Pittsburgh	95.0	97.0*	Detroit	98.0
Chicago	96.5	97.5	Birmingham	96.5
Philadelphia	93.0	96.0	Wheeling	99.0
Valley	95.0	98.0	S. Ohio River	81.0
West	100.5	99.5*	St. Louis	95.5
Cleveland	97.0	95.0	East	88.0
Buffalo	106.5	106.5	AGGREGATE	94.0

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,522,470 net tons.

* Revised



Markets at a Glance

Boost Titanium Output . . . Rem-Cru Titanium, Inc., believes it will be able to increase titanium production at its Midland, Pa., plant 300 pct during the first 6 months of 1954. Early in 1954 the company plans to turn out 10 ingot tons of titanium per day compared with its present rate of 3 tons per day. Rem-Cru, which is owned jointly by Remington Arms and Crucible Steel Co., is currently building a new 10,000 sq ft building as part of its expansion program.

Raise Stainless Capacity . . . Republic Steel Corp. is planning to install a cold-rolling mill and auxiliary equipment for cold-reducing stainless steel coils. The new facilities will increase the company's stainless rolling capacity by 1800 tons. Project is scheduled for completion in about 18 months. Meanwhile, Republic shut down its blast furnace at Troy, N. Y., for relining. The furnace will be back in operation in about 34 more days.

Radio-TV Sets Sales Climb . . . Combined sales of Westinghouse television and radio sets were 350 pct ahead of the same month last year. TV sets showed a 216 pct increase, while radio sales were up 499 pct.

Air Freight Rates Up . . . Civil Aeronautics Board has approved a 25 pct increase in minimum air freight rates, effective Nov. 20. New minimum will be 20¢ per ton-mile for the first 1000 and 16 1/4¢ for each ton-mile thereafter. Bureau estimates the actual increase will not amount to more than 12 pct generally, since rates now in effect are for the most part at least 10 pct above former minimums.

Canadian Scrap Dips . . . Demand for iron and steel scrap has slumped in Canada and no sudden strengthening of the market is expected. Mills are placing token orders for steel grades but are out of the market for mixed borings and turnings. Drop in demand has pushed prices on mixed borings down \$4 to \$22.50, while cast scrap is off \$2 to \$46.

Scrap Builds Strength . . . Firmness in the scrap iron and steel market this week pushed THE IRON AGE Steel Scrap Composite up to \$34.17 per gross ton from last week's \$32.83. The road to recovery was gradual but strength and optimism were building after scrap's deep slump. When a large Pittsburgh consumer bought this week it paid \$3 per ton more for secondary open-hearth grades. No. 1 steel moved up \$2 in sympathy. (See p. 124.)

Pick Up Freight Tab . . . Steel consumers are not shy about asking for freight deals and seem fairly successful in getting them. This practice is not limited to high cost steel producers either. Steelmakers who do not yet admit they are making freight deals concede the pressure is strong. Some big producers practically advertise that they will deliver in the Detroit area at local mill prices.

Strike at Alan Wood . . . A wildcat strike stopped ingot production at Alan Wood Steel Co. on Monday when openhearth workers walked out despite "no strike" and grievance settlement clauses in the contract. The Philadelphia district office of the United Steelworkers of America has assured the firm that it has every intention of fulfilling the contract.

Distributors Expect Better Sales . . . Most distributors of industrial machinery and supplies believe business will be better in 1954 than it is this year. According to a sampling taken at a joint meeting of the American Supply & Machinery Mfrs. Assn. and the National Industrial Distributors Assn. only 1 out of 20 distributors foresees a business decline in the first half of '54, while 2 anticipated a dip in the second half. The rest expect their business will either hold at present levels or improve.

Locomotive Backlogs Halved . . . Installation rate of new locomotives by railroads is running 30 pct below last year's level and factory order backlogs have been cut in half since a year ago, reports Assn. of American Railroads. Reports show railroads installed 1667 new locomotives during the first three quarters of 1953, compared with 2417 for the same period in 1952.

Prices At A Glance

(cents per lb unless otherwise noted)

Composite Prices	This Week	Last Week	Month Ago	Year Ago
Finished Steel,				
base	4.634	4.634	4.634	4.376
Pig Iron (gross ton)	\$56.59	\$56.59	\$56.59	\$55.26
Scrap, No. 1 hvy,				
gross ton)	\$34.17	\$32.83	\$31.50	\$42.00
Nonferrous Metals				
Aluminum, ingot	21.50	21.50	21.50	20.00
Copper, electrolytic ..	29.75	29.50	29.50	24.50
Lead, St. Louis	13.30	13.30	13.30	13.30
Magnesium, ingot	27.00	27.00	27.00	24.50
Nickel, electrolytic	63.08	63.08	63.08	59.58
Tin, Straits, N. Y.	80.75	80.25	82.75	\$1.21 1/2
Zinc, E. St. Louis	10.00	10.00	10.00	12.50

Non-Ferrous Markets

Ask Limit to "Buy American" Exception

Aluminum warehousemen ask U. S. to limit military imports to pig and ingot . . . Remelt aluminum lower, possibly at bottom . . . Smelters raise copper price—By R. L. Hatschek.

Aluminum warehousemen have come out asking for a revision in the government's recent policy decision to except aluminum from the Buy American Act under which materials are procured for the Armed Forces. The National Assn. of Aluminum Distributors is in favor of limiting the exception to pig and ingot only.

In a letter to Assistant Defense Secretary Charles S. Thomas, the association points out that aluminum is not in short supply. Members of the group report adequate, well-balanced inventories and primary producers are able to deliver semi-finished metal in 4 to 8 weeks, it's claimed. Neither are foreign prices generally competitive with the exception of Canada's.

Ingot Dips Again . . . Secondary aluminum ingot prices were slipping again on the low side of the range this week. Bottom-of-the-spread prices were quoted $\frac{1}{4}\text{¢}$ to $\frac{3}{4}\text{¢}$ per lb lower. But ingot makers feel that the bottom has been reached and future changes are likely to be in the other direction.

Scrap prices seem to have leveled off and a tightening of the market has been noted. Reason is that exports have been siphoning off fairly heavy quantities of the light metal scrap and competition is

heightening. This is very similar to the situation which recently pushed up copper scrap prices.

Only the Usual . . . Last week it was stated that aluminum producers hadn't been touched by power shortages in the Southeast. That wasn't quite right. They haven't been touched any unusual amount for this time of year. Actually, Aluminum Co. of America's reduction plant at Alcoa, Tenn., has four potlines down—but it is stressed that such shutdowns are expected and provided for in scheduling.

With national defense aluminum setasides for the first quarter trimmed 18 pct smaller than fourth quarter and the market showing signs of easing, it seems there won't be any difficulty in procuring aluminum in most forms during first quarter.

Smelters Raise Prices . . . Higher consumer demand for November copper and the continuing lack of a settlement of the U. S.-Chilean copper talks resulted in a $\frac{1}{2}\text{¢}$ per lb increase in copper prices by custom smelters last week. First firm to move was quickly followed by others and puts the custom smelter quotation at 29.50¢ while mine producers hold to their 30.00¢ price.

Shipments of ingot brass and bronze for September totaled 21,463 tons, according to figures of the industry's Defense Council. This is approximately 1300 tons higher than August and is slightly better than shipments have been running for the summer months.

Magnesium Steadies . . . Production of primary magnesium during August totaled 6265 tons as compared to July output of 6206 tons, reports Magnesium Assn. The figure will probably stick very close to these totals until there is some basic change in the magnesium picture since this production is the total of Dow Chemical Co. and the one government-owned plant that was not shut down in June.

Wrought product shipments for August were 716 tons, against 794 during July. Casting shipments data, a month older than the others, indicates a July total of 1127 tons compared with 1568 tons in June. This drop is significant since the average for the first half was 1563 tons.

Expand Titanium . . . Rem-Cru Titanium, Inc., will step up output of titanium 300 pct at its Midland, Pa., plant during the first half of 1954. Ground was broken last week as a starter to the expansion which will boost production from 3 to 10 ingot tons daily. Naturally a titanium shovel was used to start the job.

Lead, Zinc Coast . . . Latest zinc import figures should prove somewhat heartening to U. S. producers. Total tonnage of metal and metal content of ores and concentrates was 65,946 tons in August as compared to 85,212 tons in July. While no official figures have yet been released, imports have practically evaporated in September and October.

August imports of lead totaled 38,061 tons—a sharp rise from the previous month's 29,177 tons. Markets for both of the metals continue dull.

NONFERROUS METAL PRICES

(Cents per lb except as noted)

	Oct. 21	Oct. 22	Oct. 23	Oct. 24	Oct. 26	Oct. 27
Copper, electro, Conn. . . .	29.50— 30.00	29.50— 30.00	29.50— 30.00	29.50— 30.00	29.50— 30.00	29.50— 30.00
Copper, Lake delivered . . .	30.125	30.125	30.125	30.125	30.125	30.125
Tin, Straits, New York . . .	79.75	79.50	80.00	—	80.75	80.75*
Zinc, East St. Louis . . .	10.00	10.00	10.00	10.00	10.00	10.00
Lead, St. Louis . . .	13.30	13.30	13.30	13.30	13.30	13.30

Note: Quotations are going prices

*Tentative

Nonferrous Prices

(Effective Oct. 27, 1953)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.136-in. and thicker, 2S, 3S, 33.9¢; 4S, 36.0¢; 52S, 38.2¢; 24S-O, 24S-OAL, 37.0¢; 75S-O, 75S-OAL, 44.7¢; 0.081-in., 2S, 3S, 35.1¢; 4S, 37.1¢; 52S, 39.9¢; 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 46.9¢; 0.032-in., 2S, 3S, 37.0¢; 4S, 41.8¢; 24S-O, 24S-OAL, 46.9¢; 75S-O, 75S-OAL, 58.4¢.

Plate, 1/4-in. and Heavier: 2S-F, 3S-F, 32.4¢; 4S-F, 34.5¢; 52S-F, 36.2¢; 61S-O, 35.6¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 44.3¢.

Extruded Solid Shapes: Shape factor 1 to 5, 37.4¢ to 82.8¢; 12 to 14, 38.2¢ to 99.0¢; 24 to 26, 40.9¢ to 51.29¢; 36 to 38, 48.4¢ to 51.89¢.

Rod, Rolled: 1.064 to 4.5-in., 2S-F, 3S-F, 43.8¢ to 37.2¢; cold-finished, 0.376 to 3.499-in., 2S-F, 3S-F, 47.6¢ to 39.3¢.

Screw Machine Stock: Rounds, 11S-T3, 1/2 to 11/32-in., 59.6¢ to 47.0¢; 1/2 to 1 1/2-in., 46.6¢ to 43.8¢; 1 9/16 to 3-in., 42.7¢ to 39.9¢. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 44.1¢ to 32.4¢; 52S, 53.4¢ to 39.1¢; 17S-T4, 60.1¢ to 41.8¢; 61S-T4, 53.9¢ to 41.3¢.

Extruded Tubing: Rounds, 63S-T6, OD 1 1/4 to 2-in., 41.6¢ to 60.7¢; 2 to 4 in., 37.7¢ to 51.1¢; 4 to 6 in., 38.2¢ to 46.6¢; 6 to 9 in., 38.7¢ to 48.8¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42¢ x 60 in., \$2.838; x 96 in., \$4.548; x 120 in., \$5.680; x 144 in., \$6.816. Coiled sheet, per lb, 0.019 in. x 28 in.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FSI-O, 1/8 in., 66¢; 3/16 in., 68¢; 1/2 in., 70¢; B & S Gage 10, 71¢; 12, 75¢. Specifications grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam 1/4 to 0.311 in., 77¢; 1/2 to 3/4 in., 60¢; 1/2 to 1.749 in., 56¢; 2 1/2 to 5 in., 61.5¢. Other alloys higher. Base up to 1/4 in. diam, 10,000 lb.; 3/4 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.8¢; 0.22 to 0.25 lb, 5.9 in., 62.5¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.6 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/4 lb, 10,000 lb; 1/2 to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.067 in. wall thickness: OD, 1/4 to 5/16 in., \$1.43; 5/16 to 1/2 in., \$1.29; 1/2 to 5/8 in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, 1/2 to 5/8 in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1 1/4 in., 10,000 lb; 1 1/2 to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(100,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, \$16; Plate, HR, \$12; Wire, rolled and/or drawn, \$10; Bar, HR or forged, \$6; Forgings, \$6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

"A" Nickel Monel Inconel

Sheet, CR	86 1/2	67 1/2	92 1/2
Strip, CR	92 1/2	70 1/2	98 1/2
Rod, bar	82 1/2	65 1/2	88 1/2
Angles, HR	82 1/2	65 1/2	88 1/2
Plate, HR	84 1/2	66 1/2	90 1/2
Seamless Tube	115 1/2	100 1/2	137 1/2
Shot, blocks	60	...	...

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41	...	48.48
Cooper, h-r	45.38	44.73	...
Copper, drawn	45.98	...	...
Low brass	44.47	44.41	...
Yellow brass	41.72	41.66	...
Red brass	45.44	45.38	...
Naval brass	45.76	40.07	41.33
Leaded brass	40.07	39.11	...
Com. bronze	46.95	46.89	...
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	...
Muntz metal	43.96	39.77	41.02
Ni silver, 10 pct	55.36	...	62.63

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99 + %, 10,000 lb, freight allowed	21.50
Aluminum pig	20.00
Antimony, American, Laredo, Tex.	34.50
Beryllium copper, per lb conta'd Be, \$40.00	
Beryllium aluminum 5% Be, Dollars per lb contained Be	\$72.75
Bismuth, ton lots	\$2.25
Cadmium, del'd	\$2.00
Cobalt, 97-99% (per lb)	\$2.40 to \$2.47
Copper, electro, Conn. Valley	29.50 to 30.00
Copper, Lake, delivered	30.125
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$165 to \$175
Lead, St. Louis	13.30
Lead, New York	13.50
Magnesium, 99.8 + %, f.o.b. Freeport, Tex., 10,000 lb.	27.00
Magnesium, sticks, 100 to 500 lb.	45.00 to 47.00
Mercury, dollars per 16-lb. flask, f.o.b. New York	\$183 to \$186
Nickel electro, f.o.b. N. Y. warehouse	63.05
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	\$22 to \$24
Platinum, dollars per troy oz.	\$91 to \$93
Silver, New York, cents per oz.	85.25
Tin, New York	80.75
Titanium, sponge	55.00
Zinc, East St. Louis	10.00
Zinc, New York	10.50
Zirconium copper, 50 pct	\$6.20

REMETALLED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5 ingot	24.50
No. 115	23.75
No. 120	23.25
No. 123	23.25
80-10-10 ingot	28.75
No. 305	26.50
No. 315	26.50
88-10-2 ingot	37.50
No. 210	34.00
No. 215	29.50
No. 245	20.75
No. 405	25.25

Aluminum Ingot

(Cents per lb del'd, 30,000 lb and over)

0.30 aluminum-silicon alloys	22.75-23.25
0.60 copper, max.	22.25-23.00
Piston alloys (No. 122 type)	20.25-21.50
No. 12 alloy (No. 2 grade)	19.50-20.50
108 alloy	20.00-21.50
195 alloy	21.00-22.00
13 alloy (0.60 copper max.)	22.50-23.00
ASX-679	20.00-21.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97 1/2%	20.50-21.00
Grade 2—92-95%	19.00-20.00
Grade 3—90-92%	18.00-19.00
Grade 4—85-90%	17.00-18.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.54
Electrodeposited	38.38
Flat rolled	47.14
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	35.00
Rolled, depolarized	36.00
Cadmium	\$2.15
Silver 999 fine, rolled, 100 oz. lots, per troy oz. f.o.b. Bridgeport, Conn.	94.16

Chemicals

(Cents per lb, f.o.b. shipping points)	
Copper cyanide, 100 lb drum	63.90
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz.	75%
Sodium cyanide, 95 pct domestic	
200 lb drums	
Zinc cyanide, 100 lb drum	19.25
Block tin	65-67
No. 1 pewter	40-45
No. 1 auto babbitt	37-38
Mixed common babbitt	11-12
Solder joints	14-14 1/4
Siphon tops	35
Small foundry type	14-15
Monotype	13-13 1/2
Lino. and stereotype	11 1/2-12 1/2
Electrotype	10 1/2-11
Hand picked type shells	7-8
Lino. and stereo. dross	4 1/2-5 1/2
Electro dross	3 1/2-4

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

Copper	26	25 1/2
Yellow brass	19 1/2	18
Red brass	23	22 1/2
Comm. bronze	23 1/2	22 1/2
Mang. bronze	18 1/2	17 1/2
Yellow brass rod ends	19 1/2	

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	24	23 1/2
No. 2 copper wire	22 1/2	23
Light copper	21	21 1/2
No. 1 composition	17	17 1/2
No. 1 comp. turnings	16 1/2	17 1/2
Rolled brass	14 1/2	15
Brass pipe	16	17
Radiators	13	13 1/2

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	24	23 1/2
No. 2 copper wire	22 1/2	23
Light copper	21	21 1/2
No. 1 composition	17	17 1/2
No. 1 composition turnings	16 1/2	17 1/2
Unlined red car boxes	13 1/2	14
Cocks and faucets	13 1/2	14
Mixed heavy yellow brass	11	12
Old rolled brass	13 1/2	14
Brass pipe	15 1/2	16
New soft brass clippings	16 1/2	17
Brass rod ends	14	15
No. 1 brass rod turnings	11	12

Aluminum

Alum. pistons and struts	6	6
Aluminum crankcases	8	8
2S aluminum clippings	12	12
Old sheet and utensils	8	8
Borings and turnings	5	5
Misc. cast aluminum	8	8
Dural clips (24S)	1	1

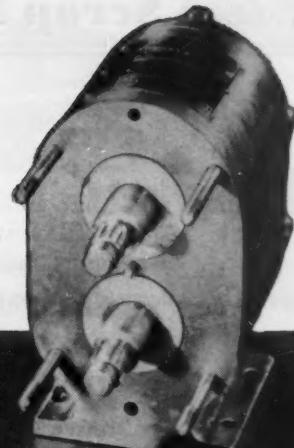
Zinc

New zinc clippings	5	5
Old zinc	3 1/2	4
Zinc routings	2	2
Old die cast scrap	2 1/2	2 1/2

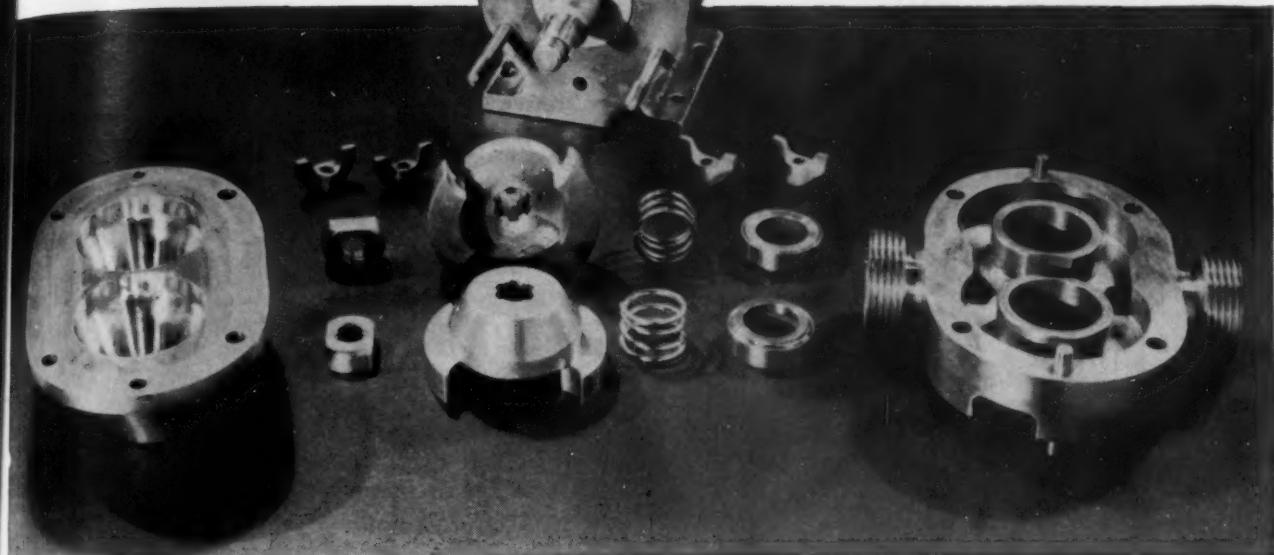
Nickel and Monel

Pure nickel clippings	70	70
Clean nickel turnings	60	60
Nickel anodes	70	70
Nickel rod ends	70	70
New Monel clippings	26	26
Clean Monel turnings	19	21
Old sheet Monel	24	26
Nickel silver clippings, mixed	14	14
Nickel silver turnings, mixed	12	12

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For Handling Heavy or Light, viscous or non-viscous liquids, this positive displacement twin-blade impeller type nickel silver pump gives smooth even flow with minimum pulsations. Six sizes available . . . handling from 250 to 60,000 pounds per hour against a 100-lb. head. Capacity is regulated by number of r.p.m. at which pump is driven. Gear case, pump head, body, cover, rotor-retaining nut, impellers and rotary seal parts are of nickel silver. Spring is Type 316 chromium-nickel stainless steel. This new pump was developed by Waukesha Foundry Co., Waukesha, Wisc.



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Solid white metal all the way through, nickel silvers usually provide greater strength and corrosion-resistance than do

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Firmness Radiates Through Markets

Iron Age Steel Scrap Composite climbs . . . Optimism builds up . . . Pittsburgh's main buyer pushes secondary openhearth grades up \$3 . . . Other centers show price hikes.

Firmness radiated through the scrap market from several important scrap centers this week, sending THE IRON AGE Steel Scrap Composite to \$34.17 from \$32.83 last week. It was still too premature to foretell the extent of scrap's budding recovery but optimism was building.

Main lever for the latest price rise seems to be scrap's stubbornness to move at prices considered too low. In Pittsburgh the main buyer moved into the market for secondary openhearth grades—and the price climbed \$3 per ton. No. 1 heavy moved up \$2 in sympathy.

Chicago prices moved up almost across the board as No. 1 heavy moved to \$33 to \$34. Youngstown No. 1 heavy rose \$2.

Special conditions governing steel scrap exports under the open-end quota policy have now been announced for the fourth quarter.

Applicants must have "accepted orders" for the scrap, the scrap must be shown as being available, and applications must show certification.

Also, fourth quarter licenses will be valid only for a period of two months, following month of issuance and not after Feb. 28.

Pittsburgh—A purchase by a large consumer jumped the price of secondary openhearth grades \$3 per ton this week. No. 1 heavy melting steel moved up \$2 per ton on appraisal. Higher prices had been indicated by difficulty of brokers in filling cheaper orders. Dealers have been holding onto scrap in anticipation of higher bids. Meanwhile, mills still hold command of the market. Mill inspectors are wielding a big stick, and car rejections are up.

Chicago—Chicago's scrap market continued to look better this week

and this time increases were confirmed by mill sales. Broker buying had been going up prior to last week's sales, but mill sales had been few and in low tonnage. Effect was to carry up prices in all grades, and a few were boosted out of proportion to the general raise. Scrap was beginning to come in at a fairly good rate. Feeling on turnings was divided, but the grade showed considerably more life and asking prices began to climb.

Philadelphia—Prices remain unchanged this week in the almost complete absence of new mill buying. Higher prices were expected momentarily early this week. Mills, in general, are not anxious to take on scrap since they have ample stocks. Alan Wood Steel Co. stopped shipments on Monday following a walkout of workers in the openhearth shop.

New York—At press deadlines the New York scrap trade expected a major consumer to come into the market at any moment. When this happens an already firming market should be given further strength. Brokers were understandably gun-shy about price predictions, but trade consensus is that hope of new business plus looming exports have pushed steel-making grades about \$1 over last week's quotation.

Detroit—The market here is completely dormant with no mill buying of any consequence. Local consumers are too comfortable to come into the market and out of district buyers show even less interest. New model production is increasing some scrap generation, but auto companies that have not yet changed over are offering about 40 pct less tonnage in November than normal.

Cleveland—Purchase of No. 2 steel in the Valley by a leading consumer at \$3 a ton above the market has boosted prices in this area. No. 1 steel and low phos are \$2 higher on ap-

praisal. Blast furnace grades are also up \$2 to \$24 on the basis of a sale. Dealers aware of consumer resistance to high prices are hoping increases do not precipitate a reaction.

Cincinnati—Movement of limited tonnages by barge has lifted openhearth prices \$2 locally. Sympathetic adjustments on other items average out to a \$1 increase. Cast, still sluggish, remained unchanged. Dealers and brokers expected prices to lag behind other areas.

St. Louis—Nearly all scrap items were up this week. There was a small amount of mill buying at higher price levels. Meanwhile brokers increased prices to bring out the scrap that had been held back.

Birmingham—Although prices were unchanged this week, the scrap market in the South is showing a stronger undertone. An Alabama mill was in the market this week buying at unchanged prices. Recent increases offered by northern mills have resulted in movement of some scrap the last few days but most dealers, particularly in Florida, are holding on to their scrap awaiting an export market which they expect soon.

Buffalo—Scrap prices appeared heading for a showdown here as dealers have virtually completed old orders while mills stayed out of the market. Prices so far are nominally unchanged. Dealers' yard stocks are substantial. Steadiness in markets elsewhere is the major factor here.

Boston—Trading in New England has been erratic since the recent severe price decline. Members of the trade are hopeful of higher, more stable prices soon—but how soon remains a question.

West Coast—Prices have not changed in spite of a firmer market, and little change is expected in the near future since mill inventories are high. Dealers are expected to press for Japanese business. Five of eight export licenses have been granted. A firm offer of \$28 per ton for 10,000 tons No. 1 heavy f.o.b. West Coast port through a New York broker is reported.



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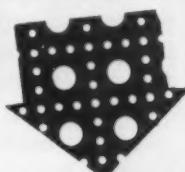
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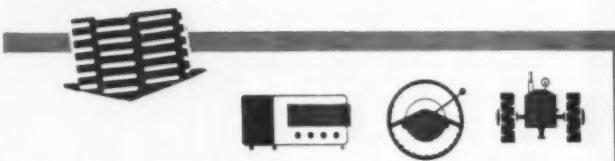
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No. 2 CINCINNATI Vertical Mill, dial type, new 1945
No. 2 VAN NORMAN Plain Horizontal, new 1943
No. 3-24 CINCINNATI Plain Hydromatic Mill, AC-MD
No. 4 KEARNEY & TRECKER Plain Horizontal Mill, No. 50 taper, motor in base, rapid traverse
No. 4 CINCINNATI High Speed Dial Type Plain Horizontal Mill, new 1943
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NEWS OF USED AND REBUILT MACHINERY

Upturn Easing . . . Reports from Chicago's Machinery Row indicate that the September upturn may be easing. Reaction is mixed: a few sources seem to be just holding their own, while many others say business is beginning to slide and that they have little hope for improvement until early next year.

Some dealers, however, have been encouraged by inquiries from stainless steel users seeking equipment for working stainless steels. Interest in machinery such as spinning, shearing and braking equipment to handle stainless is apparently the result of revocation of nickel controls. With nickel restrictions due to go off on Nov. 1, stainless producers believe there will be a pickup in their business.

According to stainless producers, nickel controls only served as an added drag on an already slow market. Inability to obtain needed 18-8 forced some users to substitute materials. Another reason stainless manufacturers look for an increase is that speculation about when nickel would be decontrolled caused consumers to hold back on orders and reduce inventories while waiting for controls to go off (THE IRON AGE, Oct. 15, p. 55.)

Rebuilders Busy . . . Rebuilders in the Chicago area report business is still holding up quite well. Though the Livonia fire never did give as much of a push to the rebuilding and used machinery market as some sources had hoped, it did provide some additional business.

Of greater importance, however, was the slight increase in industrial buying following the summer vacation period. Rebuilders, according to Midwestern sources, will continue to be fairly busy throughout the rest of the year.

Push Promotion . . . Typical example of used machinery dealers' increasing interest in promotion was the Interstate Machine Tool Co.'s fourth annual machinery fair

held in Chicago, Oct. 13-16. It was attended by more than 650 visitors, some from as far west as Denver.

The fair not only created new business for Interstate but also proved extremely educational for those who attended. Included in the program were plant tours and panel discussions by guest authorities.

Used TV . . . When the crowd attending the fair overflowed the original meeting room, closed circuit television was used so that visitors in other parts of the plant could also benefit from the discussions.

There are indications that the machinery fair idea may be spreading. At least one eastern firm wanted detailed information on how to conduct an industrial clinic of this type.

Freight Study Near End . . . Machinery Dealers National Assn.'s survey of freight costs is nearing completion. A second questionnaire was mailed out recently and the results should be ready for presentation in January.

Preliminary indications are that MDNA will have good grounds for requesting a change in the present freight rate classification for used machine tools.

The second questionnaire was sent out to expand the study of the distribution area of single used machinery firms and to provide more data on the effect current freight rates have in limiting the area in which dealers can trade.

Hold Auction . . . Public auction sale will be held at Park Mfg. Co., 1200 Park St., Hartford, Conn., Nov. 5 at 11 a.m. Equipment may be inspected from Nov. 2 to sale date.

Up for bids will be single and multiple spindle automatics, screw machines, tooling and tool room equipment in addition to many other pieces of machinery.